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Agricultural Research Institute
PUSA

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Contents.

The Managing Editor presents his compliments to all readers of the *Planters' Chronicle* and wishes them a Prosperous New Year.

A very interesting article is contributed by the Planting Expert, giving his impressions of his visit to Messrs. Matheson & Co's Rubber Estates which by the kind permission of Mr. Mahon we are able to publish. It is important that the Planting Expert advises the use of cuttings by selection rather than seed, as being more likely to secure trueness to type especially in a tree so variable in yield as the Ceará. The whole article is of practical value and guidance to Rubber planters.

A short report from the Bababudin Planters' Association is published and a short continuation of Nilgiri notes, and it is pleasant to note in the latter that the coffee so far cured is better than that of last year. For those intending to experiment with *Robusta Coffea* the article on it will prove interesting. The yield appears very good, but this may be a question of climate, and it does not do to be too sanguine, and it is to be regretted that it has not been found immune from disease.

Only a short notice could be taken of the New York Rubber Exposition —the pages of *The India Rubber World* being literally crammed with matters of absorbing interest. But it has been thought advisable to once again warn Rubber Planters of the possible advent of Synthetic Rubber in the future. The laying of that bug bear largely lies in their own hands.

The Chairman has nominated the Hon'ble Mr. Barber to represent this Association before the Commission now sitting in Madras.

During the Christmas Holidays a fête had been held in the Cubbon Park, and one of the most interesting booths was that erected by Mr. Krumbiegel, Economic Botanist to the Government of Mysore, which contained Rubber Exhibits, rubber trees in the process of being tapped and rubber knives, &c. We believe it would be a good thing to have permanent cases in the offices of the Association. Many people have asked the Secretary where these can be seen, and he hopes to secure the support this year of all planters.

Scientific Officer's Papers.

CXIV—CEARA RUBBER IN COORG.

During my recent visit in Coorg in connection with the assumption of his duties by the Scientific Assistant I was enabled by the courtesy of Mr. Mahon to inspect the Ceará Rubber in South Coorg and see the progress that had been made with this industry.

The following is an extract from a report I wrote for Messrs. Matheson & Co., as a result of this visit which Mr. Mahon has given me permission to publish for the benefit of those who are interested in Ceará Rubber in other planting districts :—

I have been re-reading what I have written from time to time in the *Planters' Chronicle* about Ceará Rubber. I would like to say at the outset how delighted I am with the work that has been done on the estates and the spirit in which this new industry is being studied. My original opinion as stated in my report on my first visit to Coorg that, 'I saw no reason to suppose that this industry will prove anything but satisfactory in the district' has been amply justified in the light of the work done upon it.

CULTIVATION AND MANURING.

In that report also I said, 'It must be remembered that this, like other crops, will respond to good soil and good cultivation.'; and again in a lecture delivered at Yercaud in 1910. 'Ceará Rubber will respond to good land and good cultivation just as much as coffee or any other crops; and if it is to be grown seriously every attention should be paid to this.' When considering the results already obtained allowance must be made for the fact that the large majority of the Ceará Rubber now being tapped, if not all of it, has been badly neglected. It was planted in poor land for the most part and then allowed to take care of itself. Now that it has been proved beyond dispute that as far as South Coorg is concerned this is a paying crop, future plantations should receive just as much care as coffee or Pará rubber receive, they should be planted in as good land as possible, cultivated, kept free from grass and noxious weeds, and manured if necessary. If this is done, more even clearings will be obtained as well as larger trees. The evenness of a clearing is an important factor in rubber cultivation, because when the tapping stage is reached 90% or more of the trees can be tapped, making the tasks more easy to arrange for the tappers, and generally facilitating the field arrangements and reducing the cost of production. So important is this factor to my mind that I consider it is better for a clearing to be a year behind in growth but even, than for it to make a remarkably rapid but uneven growth. This being so I wish to suggest that it would be well to examine clearings annually after they are 18 months old and fork round, and manure all backward and small trees with the idea of making them catch up their bigger neighbours, and to aim at getting an even clearing before manuring it as a whole.

TAPPING.

I was intensely interested in the field results shown and the arguments brought forward by the two schools of tappings which are existant. For my part I favour the herring-bone-paring school, despite the fact that I originally advocated vertical tapping. I object to the vertical tapping *as at present carried out* for the following reasons. As I understood the matter it was admitted by those who were adopting the vertical tapping system that the cambium was being removed at each cut, and it was argued that unless this was done a small yield of latex only could be obtained and that despite the removal of the cambium the wounds healed over satisfactorily if the exposed wood was treated with Jodelite. Trees were displayed to prove this fact and no doubt they proved it satisfactorily. Therefore, the argument ran, why not remove the cambium and get the yield ?

My objection is this. When dealing with a 24 inch girth tree, 6 inches of bark and cambium are removed, and as proved by experience the wound thus made *will heal over from the edges*, like any other wound and it will take about 2 years to do so. But suppose the tree was 48 inches in girth as it will be in a few years time. Then one foot of bark and cambium will be removed in each season's tapping and the bigger the tree the bigger the wound will be. Now it will take about 4 years for a foot wound to completely heal and by that time you will be ready to tap on to the renewed bark and the state of affairs will be one quarter of the tree just healed up, one quarter nearly healed up, one quarter about half healed up and one quarter open wound. Now the latex is a store of plant food and it must be drawn up to heal wounds and a tree in the condition just described will have a decreased latex supply and a low vitality and it is obvious that the bigger the tree the worse the conditions will be.

That is my line of argument against the present system. I am perfectly ready to admit that the final proof is the practical one in the field, but I should like the 'vertical-tapping-remove-the-cambium' school to very carefully think about my line of argument. Another thing I heard said was that Ceará will grow so quickly that it does not matter about killing the trees, in fact it is possibly the best way of using them to tap them to death and replant. But are we certain that we could replant successfully ? The land might become Ceará sick, and disease, especially root disease, might get in, due to stumps and roots in the soil however carefully we might try to remove them.

Therefore, I consider it is best to tap lightly, avoiding touching the cambium so that the wounds heal rapidly behind the knife *all over the surface* and not from the edges, as they do in the herring bone system. If the vertical system is adopted the cambium should not be cut. This will reduce the yield but I think increased yield should be obtained by other methods, namely by manuring and selection.

I have one other criticism to offer with regard to the herring bone tapping as I saw it both on Ceará and Hevea, and that is that insufficient attention was being paid to keeping the daily tapping lines parallel. I would call attention to what was said about this important point in the *Chronicle*, Vol. VI, p. 283 and there is no need for me to repeat here what was said there. A good practical way of helping the tappers to keep the right angle is to make light guide lines at one inch interval down the tree. These not only acts as guides but also allow the Superintendent to get a rapid idea of how many cuts per inch the tappers are making. A minimum of 18 should be insisted on and 20 aimed at.

One other suggestion about tapping. I understood that about 6½% of scrap was obtained and I think this could be reduced. It appeared to me from what I saw in the field that the latex did not run down the cuts very freely and was apt to coagulate in them a great deal too much. I would suggest that some experimental work be done with starting the latex flowing with water (or better still ammonia) as is done in the case of Hevea tapping. I think this would reduce scrap and consequently increase the yield of high grade rubber.

SELECTION.

On several occasions I have pointed out that Ceará is a very variable tree as regards yield of latex and rubber. In the lecture referred to above I said "In a plantation of Ceará you will probably find a very great variability between individual trees both in appearance and in yield of latex. While some trees give a good yield others give hardly any. Those of you who intend to extend your cultivation of Ceará should test your existing trees by experimental tapping and when you find a really good one, break it up into cuttings and plant your new clearings with these. These will give trees true to type, while seed will not come true owing to the natural cross fertilisation which goes on between the bad and good trees." (*P. C.* Vol. V. p. 199).

It is along these lines that I would suggest increased latex yield should be obtained rather than by severe tapping. This work has been begun at Margolly where there is a good clearing planted with cuttings from selected trees. When this comes to maturity the best tree in it should be again selected and cuttings planted from this and so on. In this work there are two points to be noted, I think, first that a tree which gives a big latex flow is not necessarily the best rubber yielder and so selection should be made for rubber yield and not latex yield only; secondly in planting cuttings a sucker should be obtained from as near the ground as possible and the stump (original cutting) should be trimmed and treated with Jodelite so as to prevent any rotting back or open wound until a good root system is established.

In my opinion all future planting of Ceará should be from selected trees and if seed is used it should be taken only from selected trees of known high rubber yield, and a process of selection should be rigidly carried out.

THINNING OUT.

Much of the existing rubber is planted too closely and as the trees grow older and increase in size it will be necessary to thin them out. This thinning should be done, in my opinion, by taking out first all the small overshaded trees, and then by removing poor yielders, &c. This will leave the trees irregularly spaced, but I do not think that that matters. If every other tree, or every other line of trees, are taken out, many of the best trees are sacrificed while bad ones are left.

MANUFACTURE.

With the present machinery this appears to be excellent and I have no suggestions to make. A line of research is, I think, to discover exactly how much to roll and wash the rubber to remove the maximum amount of resin and yet retain the strength of the rubber. Over washing and rolling is said to reduce the value, but this needs investigation.

The question of smoking is still an unsolved process. Does smoking improve the quality of the rubber as such, or does it merely improve the keeping quality, or it does it only act as a disinfectant? If the latter probably there are less costly and more easily manipulated disinfectants than smoke. These are questions to be answered and they appear to be problems which the Scientific Assistant for Coorg might legitimately be asked to study.

RUDOLPH D. ANSTEAD,

Planting Expert.

DISTRICT PLANTERS' ASSOCIATIONS.

Bababudin Planters' Assocition.

Proceedings of a Quarterly General Meeting held at Chikmagalur, on December 21st, 1912.

PRESENT :—Messrs. A. B. Boyd, (President), Allardice, Hugonin, Kerr Lovett, H. Watson and Kirwan, (Honorary Secretary).

VISITORS :—Messrs. C. Vasudeva Rao, (Honorary Secretary, Chickmagalur, P. A.,,) J. Hugonin, G. More, D. W. Meppen, G. Rose.

The notice calling the meeting was read.

The Minutes of the last meeting were taken as read.

The following resolution was unanimously passed.

"That this Association has heard with great regret of the death of Mr. Delavai Devaraj Urs, who was for some time a most popular Deputy Commissioner of this District, and accords a cordial vote of sympathy with his widow and family."

(1.) Letter from the President of the Kadur District Board announcing the sanction of the Santaveri Sunday Dispensary was read.

The Honorary Secretary was instructed to write the President of the District Board and the P. M. O. thanking them for having sanctioned the Dispensary and to ask when it would be opened.

(2.) Correspondence from the Honorary Secretary, C. of M. P. A. was explained to the meeting. It was decided that all matters in connection with the re-arrangement of Subscriptions and Laboratory for the Scientific Assistant, should be left to the Association's representatives.

(3.) Read letter from the Secretary, U. P. A. *re* Customs Duty on Plantation Machinery.

Members having pointed out that they were charged duty on Estate Tools, etc., it was resolved that :—

"The opinion of the Meeting is that all agricultural machinery and implements should be allowed into the country Duty Free."

(4.) Read letter from the Traffic Manager, M. and S. M. Ry., granting the concession asked for on manure from Dharwar to Birur, Kadur and Tarikery.

The Honorary Secretary was instructed to write and thank the Traffic Manager for granting the concession.

5. *Registration Scheme.*—The opinion of the Meeting is that we are glad to hear some scheme has been proposed and we have no suggestions to offer.

6. Proposed Toll-gate on Bababudin Hill Road.

Read letter from the District Board, and enclosure from the Secretary proposing to established a Toll-gate on this road.

Mr. C. Vasudeva Rao, Honorary Secretary of the Chikmagalur P. A. addressed the meeting, giving the views of his association on the matter.

After some discussion it was decided to appoint a committee of three: Messrs. Hugonin, Lovett and Oliver to act in co-operation which the Chikmagalur P. A., the Chikmagalur Municipality, and the Kadur District Board, in opposing the institution of this Toll-gate.

It was further resolved to support the representation of the member for Chikmagalur to the Mysore Representative Assembly in his request to the Dewan that the enquiry might be held into the expenditure of the money allotted for roads, which was promised by the Dewan by the following resolution.

"That in the opinion of this Meeting if the money allotted for roads in this district were spent on the roads, they would not be in their present deplorable condition and that Government is asked to enquire into the matter."

With the usual vote of thanks the meeting terminated.

(Signed). N. G. B. KIRWAN,
Hony. Secretary.

NYASALAND PROTECTORATE.

Agriculture in 1911-12.

The coffee industry is dying out, as planters prefer the quicker and surer returns obtained from cotton and tobacco. Although the area devoted to coffee in 1911-12 was only 4,332 acres, compared with 5,629 acres in the previous year, yet owing largely to the plentiful and early rains, the crop amounted to 796,304 lbs., valued locally at £16,381, about double the previous year's figures. On account of drought it is anticipated that very little coffee will be exported from the 1912-13 crop, and the acreage of the crop following will probably be very much smaller.

The cultivation of rubber is still more or less in the experimental stage. The exports during 1911-12 amounted to 59,471 lbs. valued locally at £10,659; this is a decrease of £1,505 on the previous year, and is attributed to fewer people engaging in the collection of wild rubber and to the scarcity of labour in West Nyasa. The actual area under cultivated rubber shows an increase of about 1,500 acres, but the greater proportion is not yet ready for tapping.—*The Board of Trade Journal.*

MEXICO.

Coffee Crop.

With reference to the the notice on p. 36 of the *Board of Trade Journal* of 3rd October, relative to coffee production in Mexico, the Acting British Consul-General at Mexico City (Mr. R. C. E. Milne) reports, under date 19th October, that the last coffee crop probably amounted to about 375,000 quintals (quintal=101·4 lbs.); the official figures are not yet published, but the Acting Consul-General is informed that in any event the total will not reach 400,000 quintals.

The first two flowerings last season in nearly all parts of the Republic were lost on account of a drought which followed the frost, and although the last flowering was an abundant one, it is stated to be insufficient to make up for previous losses.

The coming crop is not expected to be a good one, but at the time of writing (19th October) it was too early to forecast the prospects.—*The Board of Trade Journal*,

NILGIRI NOTES.

Weather.—To continue from the last notes showery weather continued up to end of November, but the first two weeks of December were fine. Then followed a week of thick mist, but not much rain. Since then it has been quite fine, very keen sun in the day with cold and even frosty nights.

Tea production is quiescent, and most estates have done a good proportion of their pruning.

Coffee crops have been coming in with a rush, and even high elevation estates have gathered over half the crop on the trees in spite of their late start. Many of the expected yields will not be realized though, but why it is difficult to say, as it has been a good "setting" season. Prices locally have declined about Rs.2 per cwt., but the outturn of the little that has been cured is better than last year.

The Experimental Plot.—It was interesting to read Mr. Anstead's vigorous defence regarding this, and gratifying to learn that all is well. The best thing to be done now is to let "well" alone, and to forget all about it for a few years, by which time it is possible that some tangible results will be evolved from the work carried on there.

Labour.—Another year is closing with still nothing done in this direction. Can anyone prophesy better prospects by the end of 1913? The following nonsense riddle was propounded to me the other day by a friend. I am sorry for him, but is it an omen ?:—

"When will the Fingerprint ?"

"When Maistries (May's Trees) brighten the coolie (cool eye)."

28th December, 1912.

RUBBER.

For several years past experiments have been carried out at Heneratgoda with a view to determining the effect of tapping trees at various intervals. The results of experiments during 1911 and the first two months of 1912 are discussed by R. H. Lock in *Trop. Agric.* (1912, 38, 385). As already mentioned in this Bulletin (1911, 9,406) the yield per tapping increases with the interval between successive tappings up to an interval of four days, and remains high up to an interval of nine days. The later experiments show that the longer the trees are tapped the greater becomes this difference in yield. During January and February of this year trees tapped at intervals of five, six and a half, and eight days each yielded a larger amount of rubber from twelve, ten, and eight tappings respectively than trees tapped at intervals of two and a half and four days from twenty-four and twenty-seven tappings respectively. Expressed as yields per acre, that of 1911 shows an increase over the average yield for 1909-10 in every instance, but the increase is much greater in the case of trees tapped at longer intervals, and ranges from 55 per cent. in the case of trees tapped at six and a half days' interval to 59 per cent. in the case of those tapped at an interval of five days. According to the figures at present available an interval of six and a half days appears likely to give the best final result, trees tapped in this manner giving the highest total yield in the first two months of 1912. Dr. Lock thinks that the facts so far available point to the desirability of increasing the interval at present in vogue between successive tappings.—*Bulletin of the Imperial Institute.*

COFFEE.

Robusta Coffee.

[*Continued.*]

Topping and Pruning.—Young plants of *C. robusta* have a strong tendency to form primary branches, thus becoming too tall for plantation purposes. It is therefore necessary to top the plants at an early stage, the process being best carried out when they are about eighteen months old; the stems should be cut back to a height of 8 feet. The plants reach their full development in about three years, the topping resulting in the formation of secondary branches, which are not markedly inferior to the primary shoots in their yield of berries. A drawback to the practice of topping is the formation of suckers at the top of the stem, and these must be removed regularly. It should also be noted that in young plants freely exposed to the sun there is an increased formation of secondary branches. The pruning required is less than in the case of Liberian coffee, but it should be commenced earlier. Injuries received during weeding also cause the production of new shoots near the base of young plants, and, as mentioned above, such shoots must at once be removed. The heavy pruning adopted for Liberian coffee is to be avoided in the case of Robusta coffee when grown as a catch-crop with rubber, since under such circumstances the life of the coffee as a crop is limited to a few years, and the removal of a large proportion of the branches would seriously affect the total yield. Gallagher recommends that all pruning should be done with a sharp knife, and not by plucking.

Yield.—*C. robusta* first comes into flower about a year after planting out, though shorter periods have been noted in plantations in Sumatra. As in the case of Liberian coffee, flowering continues more or less regularly all the year round, but the maximum production of berries occurs during the dry season. It is stated that practically all the flowers set fruit, exceptions occurring among the first flowers formed by the plant, and also sometimes during the wet season. The time required for the ripening of the fruits after flowering is about nine months; the first harvest may therefore be looked for within two years of the establishment of the plantation. The ripe berries remain on the trees for three or four weeks, and a monthly picking is necessary.

One of the most attractive features of Robusta coffee is the heavy yield. Statistics on this point have been collected by Cramer in reference to permanent plantations in Java, where the coffee was grown under shade. On an estate where the trees were planted quincuncially, 12 feet by 12 feet, the following yields were obtained:—

Year.	Age of Coffee. Years.	Yield. Cwt per acre.
1905 ...	... 2	1·5
1906 ...	... 3	5·5
1907 ...	... 4	17·0
1908 ...	... 5	15·0
1909 ...	... 6	21·0—24·0

On another estate the coffee was set out at 10 feet by 10 feet, quincuncially, with a nutmeg tree in the place of every ninth coffee plant, and the yield was as follows:—

Year.	Age of Coffee. Years.	Yield. Cwt. per acre.
1906 ...	... 2	1·5
1907 ...	... 3	1·0 (? 10·5)
1908 ...	... 4	17·0
1909 ...	... 5	17·0

The returns of a Java estate planted out at 10 feet by 10 feet with 45 trees taking the place of nutmegs, giving a total of 290 coffee plants per acre, are quoted by Gallagher :—

Age.			Yield per acre. Pikuls.		Cwt.
2nd year	...	...	1	=	1·2
3rd ,,	...	...	6	=	7·1
4th ,,	...	...	14	=	16·6
5th ,,	...	...	14	=	16·6

It should be borne in mind, however, that local conditions may have a profound effect on the yield of the plant. It is stated, for instance, that in Singapore the yield of Robusta coffee is less than that of Liberian or even of Arabian coffee.

Robusta Coffee as a Catch-crop for Rubber.—The above figures apply to the plant when grown as a main crop, but when planted as an intercalary crop (*e. g.* with Pará rubber) the yield will necessarily be less, as a result of the shade afforded by the permanent crop becoming excessive. In this connection it will be well to summarise the present state of opinion with regard to the value of *C. robusta* as an intercalary crop for use with Pará rubber. Essential features in a temporary crop are that it should be in no way detrimental to the main crop, especially in the competition for plant food in the soil, and in its relation to pests affecting the main crop. It should give a reasonable return at the earliest possible moment; the cultivation necessary should be relatively simple and inexpensive and the preparation of the final product for the market should not, if possible, entail the use of costly machinery. These conditions would appear to be in some measure satisfied in the case of *C. robusta* though not to the extent formerly supposed. Its cultivation is simple, and a small return may be looked for during the second year, while in the third season after planting a full crop of 15 cwt. per acre may be obtained. It is also stated that, so far as experience goes, *C robusta* in no way interferes with the growth of the rubber trees. On the other hand, further experience with the coffee has shown that it is by no means so free from disease as was supposed to be the case during the early period of its introduction, and it is significant that the Department of Agriculture for the Federated Malay States advice against the interplanting of rubber with "coffee" as being "agriculturally unsound, especially as the coffee is a host plant of Fomes or root disease." Robusta coffee is not specifically mentioned in this statement, but since (as mentioned below under " Pests") Robusta coffee has been found to be susceptible to fungoid diseases attacking rubber, the warning stands good in connection with this species. Cramer has given the following outline of the course of management of a rubber estate interplanted with Robusta coffee. Flowers should appear during the first year after planting, and during the next season a small crop of between 1 and 2 cwt. per acre may be expected. The yield during the third and fourth years should have risen to about 14 cwt, per acre, but by the fifth year the shade of the rubber will have resulted in a diminution of yields in all the coffee trees except those in the middle rows, and a yield higher than 7 cwt. per acre cannot be looked for. Beyond the fifth year the intercalary crop would be unprofitable and the trees should be removed.

PREPARATION.

The preparation of Robusta coffee for the market is in no respect essentially different from that of the more important Liberian and Arabian coffees. As stated above, Robusta berries are smaller than those of Liberian coffee, and the pulping machines in use in those countries where the latter is grown will be found to be unsuited to the smaller fruits. Gallagher states that a small Lidgerwood pulper is the most satisfactory machine, and emphasises the importance of marketing a well-prepared product. The Walker pulper has also been found suitable. The pulped coffee is then fermented, and Van Lennep recommends a period of 36 hours for this process. The fermented beans should be well washed and transferred while wet to the drying-house, where they must be dried as quickly as possible. The coffee should be moved frequently during the process in order to effect an even and regular drying. If dried at less than 60° C. a difficulty is experienced in removing the silver-skin, as is also found to be the case in sun-dried samples. The Guardiola drier is mentioned by Gallagher as being especially suited. As already stated, it is estimated that 4 cwt. of the fresh berries yield 1 cwt. of marketable coffee as compared with about 10 cwt. of Liberian berries required to yield the same amount. There is, of course, an even greater superiority over Arabian coffee in this respect.

PESTS.

Down to the present time *C. robusta* has been comparatively free from serious disease. It should be borne in mind, however, that there is strong evidence that this state of affairs will not continue indefinitely, and the health of the plantation should be carefully watched. As regards liability to insect attack, Gallagher states that *C. robusta* cannot be said to show any superiority over *C. liberica*. The most dangerous insect pest is the boring beetle, *Xyleborus coffeae*, Wurth., which attacks the branches of the plant. It would appear that the best method of coping with this insect is to maintain the plantation in vigorous health, and to encourage the formation of strong secondary branches by topping. The early statements made with regard to the immunity of Robusta from fungoid diseases have unfortunately, but not unexpectedly, proved to be unfounded. The chief fungoid pest in Java is *Corticium javanicum*, which appears on the trunk and lower surface of the branches, causing the bark to dry out, and killing the wood. Cramer advises that in dealing with this disease the bush should be cut down and a sucker arising from the stump trained as the new main shoot, which should be topped in the usual manner. Much interest attaches to the question of the susceptibility of *C. robusta* to the attacks of *Hemileia vastatrix*, the fungus causing the coffee-leaf disease. Soon after the discovery of the plant it was stated that a species of Coffea practically immune from this disease had been obtained, and high hopes were entertained of the discovery. It would seem, however, that these hopes are to be by no means fully realised, since, under cultivation in Java, *C. robusta* is proving susceptible to Hemileia, though up to the present the attacks are not serious. Further, in the Federated Malay States, Bancroft reports that Hemileia is as prevalent on *C. robusta* as it is on *C. liberica*.

Similar statements as to immunity from root disease have also proved to be unfounded. Bancroft finds that in the Federated Malay States *Fomes semitostus* and *Hymenochaete noxia*, both well-known root diseases of Pará-rubber, have been found to attack the roots of Robusta coffee, a fact of great importance to rubber planters. It is partly on these grounds that the interplanting of Para rubber with coffee has been officially discouraged in the Federated Malay States.—*Bulletin of the Imperial Institute.*

RUBBER.

New York Rubber Exposition.

Three very interesting numbers of the *India Rubber World* have been received at the office which deal mainly with the late Exposition held in New York, but unfortunately are too long to publish *verbatim* in the *Chronicle.* This was the third Rubber Exhibition—the two former having been held in London— and has not only been a great trade success, but has aroused general interest, and at each recurring exhibition that interest will undoubtedly increase amongst the public as the never ending use of rubber in its manifold appliances is brought nearer home to them. Curiosity to know how these articles are manufactured and a desire to know more of those countries that supply their daily wants and luxuries (which are now steadily becoming necessaries) will extend knowledge of the habits and customs of those countries where rubber is grown: and increased knowledge must increase the sum of human happiness. Never yet has there been such a huge collection of crude rubber got together and exhibited as that which was on view at New York, and we may expect to see enormous strides made at the next Exhibition to be held in London in 1914, when it is to be hoped that Southern India will be largely represented, and earn for itself a reputation second to none as a rubber producing country. It seems impossible to foresee the limits to which rubber can be put; and with the aid of science, without which no great permanent success will be achieved, there is no reason to believe that the demand for rubber will be less than the supply. With what emotion and wonder Goodyear, whose accidental discovery has made his name immortal in the rubber world, would have compared his exhibition (the first) of rubber goods in 1851 and the gigantic Exposition of New York just closed. Two facts stand out prominently and these are "The Awakening of Brazil" and "The Arrival of Synthetic Tires.' The former country, not satisfied with dominating the coffee world, has wakened to the fact that it can also, with its enormous resources of natural rubber, dominate the rubber world, and to protect and foster this industry. "The Ministry of Agriculture of Brazil," says the *India Rubber World,* "has recently published in pamphlet form in English the decrees and regulations passed by the National Congress and approved by the President, looking to the encouragement of rubber production in that country. This action on the part of the great rubber republic is incomparably the most important step ever taken in that country to protect its leadership in rubber production." "These decrees," continues the *India Rubber World,* "and regulations are carefully thought out and comprehensive and should do much to stimulate a wide activity in rubber production in the Amazon country. These decrees cover the following points. The exemption from duties of all utensils and materials intended to be used in the culture of various rubber trees named in the decree, and in harvesting and preparation of rubber extracted from these trees, the granting of liberal bonuses ranging from $280 to $800 to those who shall start new plantations and carry them to successful production; the establishment by the Government of Experiment and Demonstration Stations at convenient places in the different states lying within the rubber territory: the building of houses where immigrants brought into the rubber country may receive proper shelter and sanitary habitations, and the building of hospitals where they may be given, free of charge, any necessary medical treatment; the construction of narrow gauge and other railways in various sections of the rubber country, including a railway from some convenient place on the Madeira-Mamore Railway to the frontier of Peru; the execution of work that shall make navigable for the shallow rubber-boats various rivers where it is impossible now for these boats to operate, the promotion of many centres of food production for the maintenance of the rubber gatherers; the holding of triennial exhibitions at Rio de Janeiro, intended for the instruction and encouragement of rubber growers; and other measures tending to stimulate the production of rubber and materially assist in the opening up of the rubber country." It only remains for Brazil to carry out with determination the above for her to resume and to maintain her head. What an object lesson all the above is in far seeing legislation. One cannot but compare the future of that country helped and sustained by its Government, with the "laisser faire" policy of a Government, which leaves the planting community to struggle unaided, and one which goes out of its way by its countenance to denude the country of its labourers—the backbone of its development.

The other fact that stood out prominently was the exhibition of two sets of automobile tires made from genuine Synthetic rubber by German chemists. It is said that the producers of natural rubber need not be alarmed as their cost has been prohibitive. German chemists set apart, five years ago, one million marks or Rs.6,56,250 to produce Synthetic rubber, and have succeeded in producing tires made of Synthetic rubber which have "carried an auto of weight 4,000 miles, apparently little worn and unpunctured, and promising a few thousand miles more." What these two sets of tires cost no one knows—but as they are the only tangible results of five years' research they must be very costly. But we wish to emphasise the fact that Synthetic rubber has arrived, and to urge that fact as a warning to planters to set their house in order betimes and not suffer the fate of the Indigo planters, who were ruined by the discovery in the laboratory by Synthetic Indigo. Rubber planters should, from to-day (if they have not already done so), study to minimise the coming of Synthetic rubber, for come it will, as sure as morning follows night, and this can only be done by economy of cultivation, the employment of the most up-to-date machinery in preparation, and scientific aid: the two former, in our opinion, will be futile unless with the help of the latter. These are homely truths but it is only by constant re-iteration of these platitudes that these homely truths are driven home. It must be remembered that the acutest minds in Europe and America are employed in evolving in the laboratory a Synthetic rubber of commercial value to challenge the supremacy of the natural product. It took twenty five years of research to drive natural indigo out of the market, but if the high intelligence now working at the production of natural rubber will take to itself the lessons of the past, it should make it impossible for laboratory made rubber to cope with the natural product. With the scientific aid now at the disposal of rubber planters we feel convinced that Synthetic rubber is but "such stuff as dreams are made of" Dr. Driesberg, Director General of the Farbengabriken of Elberfield, says, "Synthetic rubber will surely not appear on the market in the immediate future, but I, for one, hope to live long enough to see art triumph over nature also in this industry." Dr. Perkin, Professor of Chemistry at Victoria University of Manchester, supports this view and says, "I think many will agree with the Doctor from Elberfield that cheap Synthetic rubber will be put on the market at a price which will enable it to compete with plantation rubber possessing the same properties." It remains for the planter, by the means already indicated to shatter this prophecy and make the competition impossible. It is impossible with the space at our disposal to notice all the matters of absorbing interest contained in these pages, interspersed as they are with illustrations of the various countries and machines exhibited, but Ceylon and the Federated Malay States are to be congratulated on having won gold and silver medals for their exhibits.

The Planters' Chronicle.

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THE U. P. A. S. I.

(INCORPORATED.)

Contents.

We publish, what is to be hoped, the first of many letters on the subject of Labour, which we trust will lead others express their opinions in our columns. Any and every suggestion will be welcomed that may assist the Labour Committee in their endeavour to thrash out a workable scheme to lay before the U. P. A. S. I at their next meeting.

The Scientific Department contributes a useful article on various subjects.

Bangalore notes are published with a hope that they will inspire others from planting centres to inform our readers of what is going on in their districts.

The Coffee Convention held in New York is becoming a powerful factor in the States, and in a single year has more than doubled its membership and is attracting much notice. It is a noticeable fact that while coffee prices rule high, the consumption falls off. It is the poorer classes who are the consumers and the customers of the producer. The rich don't feel it.

Rubber takes up a good many pages but this is only natural considering how large a space this industry has assumed in planting life now-a-days. By experiment only will be found the best way to prepare rubber for the market—never forgetting that the tastes of the purchaser must be consulted. Dr. Huber's report, which will be concluded in our next issue, covers a large amount of ground and countries, and in the next issue will appear Export, Labour Recruiting, and the Future of the Plantations.

Mr. Krumbiegel, Economic Botanist, has asked us on his behalf to thank sincerely those members of the association who allowed him to contribute the surplus Tea and Coffee Exhibits to the very poor at the Christmas Fête.

The planters of the Kadur District will be pleased to hear that there is every probability of the roads in their district being vastly improved in the near future. A high official is bringing to the notice of the Government the deplorable, and in some cases dangerous state of some of the roads. A motor will prove the *deus ex machina.*

CORRESPONDENCE.

The Labour Question.

Dear Sir,—What is being done to solve this question? I have read the different resolutions of the District Associations on the Registration Scheme without gaining any idea as to what their intentions are. It appears to me that the onus of producing a workable scheme satisfactory and acceptable to all Districts, has unfairly been thrown on to the shoulders of the Labour Committee, without any suggestions from any one so far as I can gather to help them, and in the hope of getting independent ideas and hints that may lighten their unenviable burden. I hope you will throw open your valuable columns and invite discussion. Some valuable flash of light on this thorny subject may escape from some inspired pen which the Labour Committee may seize on and lick into shape. Every planter in Southern India is interested in this subject, and every planter's mind should be bent on assisting by every means in his power, in overcoming a growing evil. In my opinion the future path of the planter is beset with perils and disaster, if this question is not faced—and at once. Where two or three are gathered together this Labour question is a topic of conversation; and instead of hole and corner discussions, I believe it would be better to give vent to our ideas or thoughts in the *Chronicle*. What should be everybody's business is apparently nobody's business. You will perhaps excuse me, Sir, when I say that the pages of your paper, prove you to be an adept in picking other men's brains, for beyond the valuable papers of the Planting Expert, what is there original in it? Why not, then, use that talent in extracting original or helpful ideas from our brother planters on this vital topic? As no one will open the ball, I will perform the functions of the whetstone. I may be scarified in the process, but if good comes of it I shall not have suffered in vain.

Two leaderettes have appeared in the *Madras Times* and the *Madras Mail* under the heading of " Madras and F. M. S." and "Coolies Savings" respectively, which have not attracted the attention they deserved, The former article tells us that " according to the Census of 1911 no less than 172,465 coolies were Indians (largely recruited from this Presidency)." Labour, mind you, that ought to be employed in their own country and not be allowed to emigrate. The Federated Government thoroughly appreciates the value of Indian labour and offers alluring inducements," by giving free passes, and the Emigration Committee received from their Government $450,000 to enable them to pay a recruiting allowance of $5 for each labourer imported. "Consequently 78,000 Indians emigrated in 1911 against 59,300 in 1910" and prospects are daily becoming better. With more rubber land coming into bearing, more coolies will be required, and therefore increased emigration. The *Madras Mail* advocates advertising, and points out how the Recruiters taking advantage of Government Reports, advertise the coolies savings. To reduce emigration to the lowest limits compatible with the retention of a plentiful supply of labour for South India, an appreciable rise in wages and advertising must go hand in hand. For the latter we must look to Government for help for reliable information. It will be in the remembrance of all that at the U. P. A, S. I. meeting of 1910, Mr. Aylmer Martin made these points—a rise in wages and advertising—the principal theme of his recommendations. If that gentleman does me the honour to read this he may well say " By God that's my thunder" but knowing that he has this question much at heart, I feel sure that he will forgive a convert, however puny, to his views.

Yours faithfully,
FUNGAR VICE COTIS.

THE SCIENTIFIC DEPARTMENT, U.P.A.S.I.

Use of Ammonia in Rubber Tapping.—A short time ago an article appeared in the *Chronicle* on the subject of the use of Ammonia and Carbonate of Soda in tapping Hevea (Vol. VII, p. 671). This elicited an enquiry as to the relation of the metric weights and measures in the article to ounces. It appears that 0·83 of an ounce of 17% Ammonia alluded to in the article will be required to mix with one ordinary beer bottle of water which measures one-sixth of a gallon, equal to 37 ounces of water. My correspondent suggests that it might serve a useful purpose to publish a few common tables for the benefit of non-scientific men. As he remarks "we few of us have ounce measuring glasses or imperial pints but we can all raise a tablespoon and an empty beer bottle."

It is hoped therefore that the following tables may be found of use:—

LIQUID MEASURES.

60 minims (drops)	=	1 dram.
8 drams	,,	1 ounce.
20 ounces	,,	1 pint.
8 pints	,,	1 gallon.

(The publican's pint—13 ounces).

ROUGH AND READY MEASURES.

1 teaspoonful	—	2 drams.
1 dessert-spoonful	,,	4 drams.
1 table spoonful	,,	1 ounce.
1 tumblerful	,,	½ pint (Imperial).

TO MAKE SOLUTIONS OF GIVEN STRENGTH.

½% solution	=	1 fluid ounce in	10	Imperial pints.
1% ,,	,,	1 ,,	5	,,
5% ,,	,,	1 ,,	1	,,
10% ,,	,,	2 ,,	1	,,

EQUIVALENTS.

1,000 grammes	=	1 kilogramme	=	2·2 lbs.
1,000 cubic centimetres	,,	1 litre	,,	0·22 gallons.
1 gallon			,,	4·54 litres.
1 cubic centimetre	,,		,,	0·035 fluid ounces.
1,000 centimetres	,,	1 metre	,,	32·8 feet.
1 foot	,,		,,	30·5 centimetres.

Coffee Extracts.—Some time ago I was asked by a Correspondent how to prepare Coffee Extract. *Allen's Commercial Organic Analysis*, Vol. VI, (1912) contains the following information on the subject:—

"Coffee extracts are prepared with limited success by subjecting roasted coffee to treatment with boiling water or steam and adding the volatile products to the aqueous solution. Generally the product is deficient in caffein and does not contain all the extractive matter of the coffee, nor when diluted with the appropriate amount of water is the colour the same as that of freshly prepared liquid. To remedy this defect caramel is often added, together with strong alcohol, as a preservative. In one patent addition of chicory and sugar is prescribed."

This relates to legitimate extracts, but many of the so-called extracts on the market contain no coffee at all, or very little, and are manufactured from low grade roasted and extracted Cereals.

Lime as a Soil Antiseptic.—In the Agricultural Section at the recent Meeting of the British Association of Glasgow, Dr. Hutchinson read a paper showing that Lime is found to act as an antiseptic in the soil and to produce similar sterilisation effects to those produced by heat which were described in the *Chronicle*, Vol. V, pp. 122, 147, 608. It first of all kills many of the protozoa which feed on bacteria, and later on there is in consequence a marked development of bacteria and rapid increase in the production of plant food. In another paper by Dr. Hutchinson, experiments on Nitrogen assimilation were described. Any plant residues added to the soil cause bacterial assimilation of Nitrogen and sugar causes very marked assimilation especially at high temperatures.

Restrictions on the Importation of Plants into South Africa.—The following information has been distributed as a circular by the Union of South Africa Department of Agriculture:—Nurserymen with South African customers are hereby respectfully informed that plants, excluding bulbs and seeds, are admitted into the Union from overseas only under special permit. Permits are not given at all for Conifers, or for Eucalyptus, or Acacia trees. They are freely given without regard to quantity for house Palms, Ferns, Carnations, Geraniums (Pelargoniums), Chrysanthemums, Orchids, and many other tender plants; but are given only for ten plants of a variety in the case of ornamental shrubs. While for fruit-bearing plants and roses, and for trees in general, they are given only for varieties that are not procurable in the Union and that cannot be grown from seed, and for not more than ten of a kind. It is desirable that nurserymen refrain from filling any order in the absence of knowledge that a permit has been issued, or is practicallv certain to be issued, with respect to it. Applicants are supplied with permits in duplicate so that one copy may be sent with the order. Labels and invoices should invariably give the varietal names of trees, shrubs, Roses, climbers, &c., as otherwise tbe inspectors may not be able to connect the plants with the permits. In filling orders for the latest varieties of Roses, and orders for other plants for which customers may say they are unable to get permits in advance of ordering owing to their not being able to give the varietal names, it is advisable to send to the customer a list of what varieties will be supplied a week or two ahead of despatching the plants. This action would admit of the customer getting a permit before the plants arrive, and thus perhaps avoid serious delay in the delivery of the consignment.

Scientific Assistant for Mysore.—The Council of the Mysore Planters' Associations have decided to provide the Scientific Assistant for Mysore with his own laboratory at his bungalow, Goorghully, and work will be at once started on the fittings and necessary arrangements. The establishment of his laboratory will very largely increase Mr. Frattini's efficiency as he will now be independent of headquarters and able to undertake research work in connection with Mysore problems actually on the spot.

R. D. A,

BANGALORE NOTES.

The cold weather in Bangalore is proving this year exceptionally cold and many are the laments that the bungalows have no fire places. The lowest minimum attained during December was 54·5° F on the 17th and the highest maximum 79° F on the 2nd. There has been no rain throughout the month despite several cloudy days, but the station is still several inches over the annual average for the year.

During the month several planters have called at the Office of the U. P. A. S. I. Mr. J. G. Hamilton, the late Planting Member, has just returned from home. He has spent a considerable part of his holidays in Africa where he saw Mr. E. M. Playfair on his new estate near Nairobi. Mr. Hamilton had much of great interest to tell about this country which is indeed a wonderful one. The coffee is grown without shade on undulating land on which a plough can be used. It has a small bean but gives enormous yields. At present there are no diseases and no manures are used, but the time will undoubtedly come when both will have to receive attention. Labour appears to be a difficulty, and it is a rough life for 'master' as compared with India. He gets land from the Government and nothing else and has to put up his own house and break open the land himself, and not only superintend other people doing it. From all accounts it is a great country for a young man with a little capital, not afraid of really hard work.

The recently passed Bye-law relating to Weights and Measures in the Civil and Military Station will be given effect as early as possible. This introduces the Pound as the standard weight and the Quart as the standard measure.

Prof. Rudolf of the Indian Institute of Science delivered the Inaugural Address of the South Indian Association in Madras on 4th December. During the course of his address he referred to a number of industries which might be taken as examples of the direction in which industrial progress might be developed in India, and among others he referred to the extraction of oil, a subject the planters of Southern India have long been interested in and a Sub-Committee was elected at the last Annual Meeting of the U.P.A.S.I. to deal with it together with the export of Bones. Prof. Rudolf said that the extraction of oil from seeds is an industry which, although well established in South India, was capable of enormous developments, particularly when oil pressing was joined to the manufacture of soap, and to a minor extent the preparation of candles. In the year 1909-10, oil seeds to the total value of Rs.18,72,72,039 were exported from British India and hence it was readily seen that there was ample raw material for an industry. In fact oil seeds appeared to form in value one tenth of the local exports from this country. Practically the whole of these oil seeds were used for the production of oil, oil cake being obtained at the same time. Several oil cakes, such as castor, were useful as a valuable manure, others, such as linseed, for either manure or cattle food. Whether all or a portion could be exported enconomically were questions which remained to be solved.

The making of glue from skins, horns, bones. etc. was in Europe a profitable business, but at present the greater portion of the glue used in India, and especially all that of good quality appeared to be imported, and there was apparently no good reason why with the use of a suitable plant glue making should not prove a paying minor industry as there were really no unsurmountable difficulties in the manufacture, although he understood that industrial experiments in this direction made in Madras had not proved a success, probably from want of technical skill.

Paints sold in India were ready mixed for use, and it seemed an extraordinary thing that the seed from which oil was pressed should be exported from India and much of the oil returned as a main constituent of ready mixed paints. A paint and varnish factory which would employ the necessary technical skill and take the trouble to acquire a good name would probably do extremely well in South India.

The Rt. Hon'ble Sir John H. A. MacDonald in a discourse delivered at the Royal Institution of Great Britain early in 1912 stated that there were no fewer than 200,000 motor vehicles upon the roads in Great Britain in 1911. and in that year of the 500,000 horses that were used formerly in London alone, 420,000 had disappeared from the streets. The use of motors is spreading everywhere and they are rapidly becoming common in quite out of the way planting districts. In Bangalore there are now said to be at least 100 cars. In the discourse referred to above Sir John had much of interest to say about the making of roads and the lessons taught by Macadam. The wise precepts of the latter are now often disregarded and it is forgotten that water is the enemy of the road. Have these precepts ever been learned in some districts in South India ?

At the Christmas Fete lately held one very noticeable feature was the collection of buffaloes, milch cattle and bullocks. They deserved and attracted much attention. The fine Amrhat Mahal cattle, which drew eulogistic praise from the great Duke of Wellington, were well represented. One pair was valued at Rs.1,200. It is to be hoped that the Mysore Government will not neglect these fine draft cattle, but keep up the establishment at Hunsur.

The great Violinist, Miss Marie Hall, will have paid Bangalore a visit by the time this paper is out and as she has a world wide reputation, the Bangalore public will have enjoyed a treat that may not seen occur again. Such a treat has to be paid for, but the Bangalore people think they have to pay " too dear for their whistle" (or violin in this case) forgetting that artists of repute will not cater for their instruction and amusement, at the same prices that rule in the West.

Still travelling companies should remember that the Pagoda tree no longer thrives in the East. It is like the barren fig tree.

The military are still conspicuous by their presence in the Station, as their manœuvres have been stopped on account of the transfer of the Mule Corps to Burmah, for even in mimic war, the soldier must be fed. The break down of the Turkish Commissariat has much to answer for in the present war.

One of the chief amusements for some time past has been a Skating Rink which was much patronized by the general public, but this innocent and healthful form of exercise has lately been closed to them Messrs. Spencer & Co., whose enterprize seems never ceasing, have taken over the room and added it to their business. but it is in contemplation to open an open air rink at the top of the Maidan if the land can be procured from the authorities.

A great musical treat is also in store for Bangalore during Lent when the " Crucifixion " is to be performed at St. Mark's Church. The vocal talent of the Station has been enlisted, and a choir selected from all the churches will support the soloists.

The office of the United Planters' Association of Southern India now form quite a noticeable feature of the South Parade, as brass tablets have been affixed to the outside walls and through the kindness of Mr. Krumbiegel, Econimic Botanist, new foliage plants have been added, which give the office quite a spruce appearance,

COFFEE.

Convention of Coffee Roasters in New York.

The *Spice Mill* in an Extra Number devoted to the second Annual Convention of Coffee Roasters held at New York gives a very interesting account of this meeting. It was also at the beginning called this Pure Food Association but this latter designation has been dropped. Though it is an American Institution there are subjects that will prove interesting to coffee planters in Southern India, and bear the brand of common sense.

The third article of the constitution reads " To assist in the enactment and enforcement of uniform Pure Food Laws which in their operation shall deal justly and equitably with the rights of the consumer, and the trade" with which Dr. Doolittle, Acting Chief, Bureau of Chemistry, U. S. Department of Agriculture spoke in its application to coffee. In his papers on the subject " Throughout the countries of the civilized world there is a well-defined movement for the conservation of public health, and the furthering of the cause of physical well-being. An important feature of this health propaganda is the enactment of laws governing the production, distribution and sale of food products. Our schools and colleges and various departments of state and national government are doing much to solve some of the educational problems by giving scientific and practical information for the production, proper handling and proper preparation of foods to secure their maximum food value. In the commercial world competition is said to be the life of trade. This is true of the honest competition, a contest where on the two sides we have alertness and energy guided by honesty and integrity. But it is not true of the unequal struggle where honest unadulterated products must compete with dishonest, sophisticated ones. Nearly every food product, and especially those submitted to manufacturing processes, have at one time or another been more or less sophisticated. Coffee is no exception to this rule. In fact when we recall to mind the various manipulations and misrepresentations practised in connection with this commodity, we find they cover practically every form from innocent misrepresentations as to quality, to the addition of poisonous and deleterious substances."

The Food and Drug Act provides, in case of foods, that an article shall be deemed to be adulterated,

I. if any substance has been mixed or packed with it so as to reduce or lower or injuriously affect its quality or strength,

II. if any substance has been substituted wholly or in part for the article,

III. if any valuable constituent of the artcles has been wholly or in part removed,

IV. if it be mixed, coloured, powdered, coated or stained in a manner whereby damage or inferiority is concealed,

V. if it contain any added poisonous or other deleterious ingredients which may render such article injurious to health.

" It would almost seem as though the framers of this Act had in mind the various forms of sophistication that coffee has been subjected to when they prepared these definitions."

The Doctor continues elsewhere " Thus a mixture of ground coffee and chicory. which would be adulterated if labelled and sold as coffee would not under the terms of the Act, be considered, adulterated or misbranded if labelled in a manner to show that it is an imitation plainly stated on the package, or in a manner to plainly show that it is a compound of coffee and chicory; and the word "compound" is plainly stated on the package. In this connection it should be noted that the higher courts have held in two instances that the word "compound" was not sufficient, and that the product must also be labelled in such a manner as to plainly show that the same was a compound. In other words, that the ingredients of the compound should be stated on the package. The Act itself defines the term "blend" as a "mixture of like substances," and it should be noted that a mixture of coffee and chicory is not a blend, although numerous instances of this form of labelling have come to the attention of the Department. The statement is often made on the labels of these products that they contain small amounts of chicory, when as a matter of fact they contain large amounts: also, that the chicory is used to bring out the true flavour of the coffee, when as a matter of fact, it is only used for the purpose of cheapening the product, or producing a distinctive flavour."

Dr. Doolittle further remarked "how the world at large benefitted by this Pure Food and Drug Act and in it has extended together products, until to-day we actually have a national Pure Seed and Plant Law" and in these days when many members of the Planting Community advocate advertising the advantages of home labour for the would be emigrant the following words will find a ready and acquiescent welcome—though specially referring to coffee the words are of universal application. Dr. Doolittle ended an eloquent speech in these words:—

"But there is a form of misrepresentation of food and drug products, that is not covered by the Food and Drug Act, that I should like to call attention to briefly, a form of misrepresentation that every person should take an active part in suppressing. I refer to dishonest advertising. Advertising is one of the most powerful forces of modern business. In one form or another it rules practically every man, woman and child in our land, and educationally cannot be overestimated. Now what shall be the effect of so powerful force in our land? Shall it create confidence in our fellow man and upbuild the health and happiness of our people, or shall it continue, as it has done in the past, to create suspicion of our fellow man, and undermine the health and morals of our people? This is a vital question for the people of this country and I want to tell you that every dishonest advertisement nullifies the effect of every honest one." With but a slight change in words the sense of them applies to this country.

A few extracts from the report in the *Spice Mill* of the Delegation that went to Brazil will be of interest to Coffee Planters in Southern India. The whole report is of great interest but is too long for reproduction, so only the most salient points can be extracted. Mr. Lewis read the report from which the following are taken: "The cost of production, of course, varies. Labour is cheap. The care of plantations is comparatively easy. Crop making is a long and tedious proceeding, and so is the handling of the berry from the tree to the market.' Someone gave us a rough estimate of 4c. per pound as cost of production, which does not include interest on investment. However we cannot vouch for this figure. Plantations that are operated seemed in the pink of condition. The trees were well cared for and the ground kept clear of weeds. Equipment on the plantations we visited was very complete, even elaborate, and all improvements were in excellent repair. In short, the condition of the planter on the present basis is very satisfactory, and the business of raising coffee is profitable. Plantations are valued by the number of trees, which are set 13 feet apart, and an average fair valuation is $ 5000 or $1·65 per tree. But in travelling through the country we noticed a great many abandoned plantations, abandoned in the years of low prices, and never reclaimed. These changed hands; becuse the owners were simply unable to hold them. The realized worth of a crop at that time did not even pay the operating expenses. Incidentally interest rates soared. Plantation loans during that period were rated as high as 17 per cent., and the borrower was obliged at that to pay 3 per cent. commission for placing the loan. Thus many were obliged to give up their property. The Delegation to Brazil is of opinion that conditions at that time were so near universal bankruptcy as to fully justify the Government in the various steps it took for the protection of its principal industry. It believes also that the same Government is now earnest in its profession of interest that coffee is too high and that it would be for the interest of all, Brazil included, if a lower level of prices is soon reached." "When coffee was cheap it supplanted tea in many American homes. This situation is likely to be reversed if present conditions continue." The following account of the countries where coffee is drunk and their quantities is taken from Mr. Escoba's (Colombian) speech. "Now the great coffee drinking people of the world are the phlegmatic races of the North and the United States, the people of which drink about ten pounds per head every year. There is Belgium, a pretty thriving country, with fifteen pounds, and Germany with six pounds: the Netherlands, they are pretty good people, with sixteen pounds; Norway, another phlegmatic country, with twelve and a half pounds; and Sweden, another Northern race, drinking almost thirteen pounds; the English, a tea sipping people, with two pounds."

Mr. Hermann Süleken speaking of Valorization said :—

"As far as Sao Paulo Government is concerned, when they entertained the question of valorization, they never expected to make money out of the scheme. They expected that the State of Sao Paulo would have to make a large sacrifice—two to four millions sterling—in order to enable them to help their planters. The first four years, 1906-10 they lost a great deal of money by the valorization scheme. You know in 1906-7 the market steadily went down and in 1906-7-8 it recovered very slightly, and in that whole four years 1906 10, the article remained as it had been for ten years previous, somewhere between five and eight cents a pound on the basis of option. No large profit by the States of Sao Paulo was made by them, because when I was asked to make a valuation of the coffee for the bankers for the loan, I valued the coffee at $8 a bag as I was sure that it was to be sold under the hammer and there were less than seven million and it required a surtax to make the loan a safe one together with the guaantee of the Federal Government. No profit was in that $8 and the sales had only realized $7 to $10 a bag. The Sao Paulo Government were most anxious to sell in 1906-7 in large amounts but they would not without great difficulty. Therefore, when the weather changed, and the market went up they made a better showing on their coffee, and the question immediatately arose: "Why didn't you sell it all when it was your time to sell it ?" In going to this valorization scheme, the Sao Paulo Government didn't intend to put the price up, nor did we, who were in with them, help them to do so, because all our advances were based on the down basis, not on the higher. We believed ourselves the change would be from seven cent down, not from seven cents up. They wanted to protect their planters from prices so low as to mean ruin. It was not a question of the profit. When they are making to-day a better showing, you Gentlemen, here or elsewhere, ask: "Why don't you sell now ?" The State of Sao Paulo passes out and the Committee with them and the coffee should be sold so much a year and in cases crops were small and the trade demanded it, double that operation. The State of Sao Paulo didn't want the prices so low and they did not wish the prices so high ; therefore, as we are now in a season of small crops, they could not help it.—*The Spice Mill.*

(To be continued.)

RUBBER.

Acetic Acid Coagulation.

In recent issues of the *India Rubber Journal* two interesting articles on this subject have appeared, written by Dr. P. Schidrowitz and Mr. H. A. Goldsbrough, containing the results of their experiments on the influence of varying quantities of acetic acid on one and the same batch of fresh Hevea latex regarded from the standpoint of the quality of the rubber produced as guaged by the ultimate test of the manufacturer, namely that of vulcanization.

These experiments were carried out in the Federated Malay States on latex derived from a considerable number of trees, one half of which were about six years old and the remainder ten to twelve years old; the bulked latex represented that from trees of an average of eight to nine years. Equal volumes of this latex were treated with different quantities of acetic acid and the resulting sheets of rubber, all prepared in the same way, examined. The less acid used the more these sheets had a tendency to develop moulds.

The acidity of the sheets was first studied and it was found that, "whatever the technological significance of 'free' acid may be, it seems reasonable to infer that, at any rate from mature latices from certain districts, by appropriate methods of preparation sheet and *a fortiori* crépe rubbers of a very low degree of acidity can be obtained. Secondly the figures indicate that an increase of the quantity of acid used in coagulation, even when beyond that ordinarily employed as a maximum in practice, does not, or perhaps, as the method of preparation may not be without influence in this connection; we had better say *need* not increase the amount of free acid in the finished rubber."

The absolute quantities of free acid are decidedly higher for the rubbers from young trees than in the case with the older rubbers. What the effect of mould formation on quality may be is still a moot point, but manufacturing tests showed that a moderate mould development is not necessarily of a serious nature. No doubt, however, the important factors in this connection are the type of mould and the extent of its development.

Vulcanisation tests and observations on the rapidity of cure showed that the rubbers coagulated with the smallest amounts of acetic acid were in both cases the best.

These experiments lead to the important conclusion that, "the quality of the rubber is in inverse ratio to the amount of acetic acid employed during coagulation, and this fact is quite apparent whatever method of judging is applied."

A series of similar experiments were carried out with latex from young trees and though the results obtained were not so satisfactory the same general result was observed. *viz.* that the sample prepared with the smaller quantity of acetic acid gave the best results.

The articles close with the following general remarks on the results obtained:—

"Within certain limits, the amount of acid employed in coagulation appears to be in inverse ratio to the quality of the rubber.

"In the case of sheet rubbers mould formation appears, again within certain limits, to be checked by the use of an amount of acid which is greater than the maximum desirable from the point of view of quality.

"Moderate mould formation, however, need not necessarily have a serious effect on quality. While we have no desire to suggest anything which might lead plantation managers to believe that mould may be neglected, and while we hold that it is in the best interests of the industry that goods should come to the market in as clean and homogeneous state as possible, it is clear that any sweeping inference as to the value of a rubber based on its appearance in this regard may be quite unwarranted by the facts.

"While there is increasing evidence in favour of the superior quality of properly prepared smoked sheet, it is apparent that from mature, properly handled plantation latices unsmoked rubber may be prepared which, as regards quality, compares favourably with the finest grades of wild rubber. To what extent these rubbers might have been still further improved by smoking is a question with which we hope to deal on another occasion."

The Governor of Pará invited Dr. Huber to make a report on the prospects of Hevea Rubber in Pará and we are able to give the first part of the summary from the *Times of Ceylon* which will be continued in our next issue.

Dr. Huber's Report.

GENUINE HEVEA IN THE EAST.

As I was able to convince myself, during my excursions in Ceylon, Malaya, Sumatra and Java, the cultivated trees in the Asiatic plantation belong incontestably to the species *Hevea Braziliensis*, which is recognised as furnishing the best quality of rubber. (Note. As the rubber tree seeds brought by Wickham from Brazil, and from which the Eastern plantations were propagated were collected on the margin of the Tapajes river in Pará, a river that sends out an inferior and weak rubber, it has been contended by most Brazilians that the trees in the East were not the true *Hevea Braziliensis*. Dr. Huber decides conclusively that the Eastern trees are the genuine kind). It appeared, however, that among the specimens originally introduced into the East, and of which there still exist possibly 60 in all, there are individual trees representing several variations more or less well characterised in the specific type. It is not surprising that the innate variability of the *Hevea Braziliensis* should be still further stimulated by the process of adaptation of new conditions of climate and of the soil and by very active propagation. And so it is that in the plantations are found many individual trees which by the exterior aspect differ more or less from the typical *Hevea Braziliensis*, without, however, it being possible to classify them in any other species of the kind.

PERFECT ACCLIMATISATION IN EASTERN PLANTATIONS.

Notwithstanding the extreme variability, it is not possible to speak, in the proper sense of the word, of a degeneracy in the *Hevea Braziliensis* in its new home. It is necessary to agree that the acclimatisation of this Amazonian tree in the Eastern plantations is perfect; the growth is, in general, very rapid, and the trees have in the larger part a very healthy appearance. It is true that they are subject to different parasitical troubles, in the roots and trunk, which in certain cases has caused serious loss to the plantations; but by active vigilance, it has been possible to efficaciously combat these troubles. On the other hand, the Asiatic Heveas have shown themselves free of leaf troubles, which are more dangerous than those of roots and trunk.

The culture of *Hevea Braziliensis* is an industry well-established in Ceylon, Malaya, Sumatra and Java. Plantations of the producing state also exist in some other Asiatic tropical countries such as India meridianal, Burmah, Cochin, China, in the Phillipine Islands, Borneo and in Guinea. The total area planted with Hevea in the East attained at the end of 1911 to nearly 1,000,000 acres divided as follows:—

	Acres.
Malay Peninsula	550,000
Ceylon	215,000
Sumatra	150,000
Java	125,000
Borneo and other Islands	40,000
India meridianal and Burmah ...	30,000
Cochin China	15,000
Total...	1125,000

This area would correspond to
15,000,000 trees.
more or less; as, however, many trees and even a certain number of plantations will not arrive at the producing stage, it may be said that 100,000.000 is the number of trees whose production it will be necessary to calculate till the year 1916.

PLANTATION AREA IN DIFFERENT COUNTRIES.

Notwithstanding the retardment since the end of the "boom," the extension of the plantations did not remain totally satisfactory. While in Ceylon and Java the area occupied by plantations of Hevea cannot extend itself very much owing to the topographic and climatic conditions on one hand, and to the great extension in the culture of alimentary plants on the other, in the Malay Peninsula where at present the culture of the Seringueira (*Hevea Braziliensis*) is the preponderating industry and Sumatra whose agriculture is still in its infancy, it will be possible to easily duplicate, if not triplicate, the plantation area. The same may be said of Borneo, where, however, the difficulties of communication and labour possibly retard the development of the plantation industry.—*Weekly Times of Ceylon.*

(*To be continued.*)

COFFEE AND CACAO FROM VENEZUELA.

Among the principal articles of export from Venezuela the last two years were :—

	BILIVARS.	
	1910.	1911.
Coffee	41,713,856	59,016,625
Cacao	17,521,938	18,659,956

Coffee.—In 1911 the exports of coffee were principally to the United States, 21,242,633 bolivars ; to Germany, 14,183,005 bolivars ; to France, 13,430,831 bolivars ; to Spain 4,717, 256 bolivars ; to the Netherlands, 1,165,468 bolivars; and to the United Kingdom, 3,600 bolivars.

Cacao.—In 1911 the exports of cacao were principally to France 9,483,445 bolivars; to the United States, 3,298,747 bolivars; to Spain, 1,839,658 bolivars; to Germany, 686,432 bolivars; to the Netherlands, 303,638 bolivars; and to the United Kingdom, 113,464 bolivars.—*The Spice Mill.*

The Planters' Chronicle

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THE U. P. A. S. I.

(INCORPORATED.)

Contents.

The Scientific Officer publishes in this week's *Chronicle*, a valuable article on Bees and Coffee Fertilization. The whole is interesting, but that para., dealing with the presence of bees and insects during blossom and his observation of the area defined at a subsequent visit, eminently so.

It is hoped that the article on Rinderpest may be of use to planters and others who herd cattle for manurial and dairy purposes. The remedy recommended is worth a trial, and permanganate of potash is easily procurable and should form a part of a planters' outfit.

A short account is given of other countries growing coffee, showing how extension is going on.

Doctor Huber's interesting report is concluded in this number, and columns are published in it, showing the production from 1905 to 1911 of rubber from Ceylon and Malaya, together with estimates of future production from both countries.

We have been asked by the Agent of the Bank of Madras to notice that the Bank's Reserve is now Rs.71,00,000,

As a good many of our members correspond with Mr. Ernest Green, Entomologist to the Government of Ceylon, a post that he has resigned, it may interest them to know, in case they wish to communicate with him, that until further notice after February 11th, his address will be Mote Hall, Berstead, Kent.

We have been favoured with a copy of *Planters' Pie*, which is illustrated humorously. It deals with the light and the gruesome, both well done, and it would be invidious to select one story in preference to another. The article on the Nilgiris is charmingly illustrated. We wish the Editors all success in their venture, and that the motto they have selected will be more than attained.

Extracts of a report written by Consul Osborne of Havre are published and will be continued in our next issue. They could not be published in extense this week as the remaining portion is very full of statistics which it is thought advisable to print so that they can remain on record and be handy as a reference. They bring together figures not easily to be found in so compact a form. Much other useful information too is given.

Scientific Officer's Papers.

CXV.—BEES AND COFFEE FERTILISATION.

At the Annual Meeting of the U. P. A. S. I. in 1911 the question of the value of Bees in Coffee districts and the effect of their gradual destruction was raised. While discussing the subject of the quality and curing of coffee I pointed out that, " It is a common experience among fruit growers in the Tropics that fruit does not set, and that the crop is out of all proportion to the show of blossom. Mr. C. Drieberg dealt with this matter in a paper read before a Meeting of the Ceylon Board of Agriculture last April, and made some remarks which are worth carefully thinking about by coffee planters. In the course of his address he said :—' The work of insects in the pollination of flowers is not appreciated in this country. Bees, moths, wasps and ants all assist in carrying pollen from flower to flower. Of all these the bee is, of course, of the first importance. The position in which nectar is stored is such as to bring the body of the bee seeking it in contact with both stamens and pistil, so that pollen grains sticking to the hairs on the body of the bee are distributed as the bee flits from flower to flower gathering both honey and bee-bread. ' The usefulness and the importance of the bee, ' says a writer on the subject, ' can hardly be overestimated; and successful orchard practice will never result until the work of the bee is recognised practically by the establishment of bee colonies in every orchard district.' It is often said that wet weather at the time of flowering is followed by a reduction in the crop owing to rain washing off the pollen. This according to reliable observers, requires further evidence, and the cause of non-setting is rather to be attributed to the fact that bees and other insects are prevented from paying regular visits to flowers under rainy conditions. There is no reason whatever why everyone who is cultivating fruit-producing crops should not keep a few hives of bees. Bee-keeping, apart from its value in aiding in fertilisation, is one of the pleasantest hobbies, and in indulging in it one can always rely upon securing a supply of pure honey for his table.'

" Darwin's historic work has proved that self-fertilisation tends to weaken the resultant offspring; I think that it is more than possible that self-fertilisation may reduce the quality of the coffee bean. That our coffee is largely self-fertilised there can be no doubt, and I understand that the number of bees to be found on the coffee estates in general has, for one reason and another, been reduced during the last twenty years. I suggest that it is well worth while to try the effect of Bee-keeping in connection with coffee. Honey and beeswax fetch their prices in India and the industry should, in any case, prove a self-supporting one, and the effect upon the quality of the coffee should there be any, would soon make itself apparent."

After some discussion the following resolution proposed by the Delegate for the Shevaroys, and seconded by the Nilgiri Delegate was passed :—

" That Government be asked through the U. P. A. S. I. to pass some rules prohibiting the destruction of bees in planting districts."

There has been a very marked diminution in the number of bees in coffee planting areas and it is these planting areas which the Governmet was asked to protect. The Association did not urge that any impediments should be placed in the way of collection of bees-wax or honey, but merely that measures should be taken to prevent, or diminish, the destruction of bees themselves which occurs at present when their produce is secured by means of unskilled methods.

What was asked for was that Government should enforce rules in the coffee planting areas which should ensure that the bees were not destroyed when their produce was taken.' It is quite easy to take honey and wax without destroying the bees and the present method is adopted because it entails the minimum amount of trouble.

The reply of the Government to this request was published in the *Chronicle*, (Vol. VI, p. 418) and the Government Entomologist was asked to investigate the matter. The Government Botanist and Entomologist pointed out that it had not been proved that bees are essential for the pollination of coffee, and one of the objects of the Entomologist's investigation was to determine this point.

Coffee can of course be self-fertilised and it very often is; but the point which must not be lost sight of is the influence of cross fertilisation upon quality. It is quality and not quantity which is being chiefly considered with regard to the presence or absence of bees. It may be found that other insects besides bees play an important part in the act of cross fertilisation and this also needs investigation. During the few days the coffee is in blossom, should climatic conditions be favourable, the fields will be found to be alive with insects of many kinds all visiting the coffee flowers. How many of these can actually fertilise it, however, and how many are merely robbing it of honey without being of any direct use is a point which remains to be proved by experiment. It is also possible that moths and night flying insects play their part.

It is noticeable, however, that insect visits do improve the actual yield. During the blossom season last year there was a very marked absence of insects for some reason or other, and there has been everywhere a very small crop. I happened to be on a certain estate in Coorg when the blossom was out, and while walking round with the manager we noticed that on one particular area, the limits of which we roughly defined for future observation, there were a remarkable number of bees and other insects working on the flowers. This was the more noticeable since on the majority of the estate insects were conspicuously absent. I had occasion to visit this same estate a few months ago, and on examining this particular area it was found that it was the only place on the estate where there was any crop that could be called heavy. The difference was probably one of at least two hundredweights per acre.

In a recent Circular on Bee-Keeping published by the Experiment Station of Porto Rico it is stated that :—

" The coffee planters particularly have become interested in the raising of bees, not for the honey but because bees are very useful in pollinizing coffee in seasons when there is a great amount of rain during bloom. The pollen in the coffee is carried by the winds from flower to flower, but if there is much rain, very little bloom is set as only the dry pollen is carried by wind; during rainy periods the bees visit the flowers and distribute the pollen in their honey gathering. Coffee plantations also afford excellent fields for bees to work in as honey is obtained from the coffee shade as well as from the coffee itself."

In the G. O. referred to above it is stated that, " the true solution of the problem appears to be that the planters should keep their own bees and should prevent any destruction of wild bees on their estates." This would no doubt be a remedy, and experiments in this direction have already been tried in some places. The difficulty is, however, that the active bee will not live in captivity in any form of hive, while imported bees are attacked by diseases which renders their establishment a matter of extreme difficulty. Experiments at Pusa bear out these two facts and the Imperial Entomologist stated in the *Indian Agricultural Journal* of October 1911 that "at the present time there is no race of bees which we can recommend to would-be bee-keepers in the plains of India." The Government Entomologist was asked by the Government to investigate the problem of the keeping of hive bees in the planting districts of Madras.

Unfortunately the new Entomologist, Mr. T. Bainbrigge-Fletcher, joined his appointment in the Madras Presidency too late in 1911 to see the coffee in blossom. At the Annual Meeting of the U. P. A. S. I. in 1912 a resolution was passed reminding the Madras Government of their promise that the Entomologist should investigate this subject, and the matter has been taken up.

The Entomologist expressed a wish to pay a preliminary visit to those coffee districts interested in this matter during October and November in order that he might get an idea of the conditions obtaining on the estates and make plans for carrying out of certain necessary experiments. He pointed out that as the coffee is in blossom for such a short time a plan of action should be decided upon sometime beforehand.

Consequently it was arranged for Mr. Fletcher to visit the Bababudin district of Mysore, the Shevaroy Hills and Coorg. His reports on these visits have been received, and by the courtesy of the Director of Agriculture will be published in the next number of the Chronicle.

These reports contain much that is of great interest to the planters in the districts concerned and though no plans or experiments are laid down it is hoped that these will be received before the coming blossom season, and that the Entomologist will be able then to continue his investigation and arrive at some definite conclusion as to whether the legislation asked for by the U. P. A. S. I. is necessary or not.

RUDOLPH D. ANSTEAD,
Planting Expert.

Some of the sections of the F. M. S. Labour Code, which came into operation on the 10th ultimo provide the following, which make employers of labour in the Colony almost wish for some of the drastic measures which a truly oligarchic Government can enact:—For the failure to fulfil a contract or carry out a task given to him, or for gross neglect of duty, as in the case of carelessness or drunkenness, or for quitting the service of an employer without leave, the labourer may incur a fine not exceeding twenty-five dollars. And any labourer, who shall without reasonable cause fail to perform at least twenty days' work in any one month, is liable to imprisonment of seven days. Any labourer, absent, from his employment during working hours without reasonable excuse, is liable to a fine not exceeding fifty cents.

Other sections authorise employers to arrest labourers and have them prosecuted for failure to fulfil contracts,—*Indian Planters' Gazette and Sporting News*.

RINDERPEST.

Our attention has been drawn to an article that appeared in the *Penang Gazette* referring to a valuable paper in the *Journal of Comparative Pathology and Therapeutics* by Major G. K. Walker, F.R.C.V.S., of the Indian Civil Veterinary Department which deals with the treatment of Rinderpest with permanganate of potash. In outlying Districts where veterinary aid is not procurable many valuable cattle have been lost to the planter through want of the necessary medicines near at hand at the moment of attack. Permanganate of potash appears a simple remedy, and very few medicine chests are without a supply. Major Walker says that "Permanganate of potash in solution does not appear to have been tried hitherto. It is well-known to be an excellent antiseptic and powerful oxidising agent." It has been usual to try internal doses of antiseptics in cases of rinderpest and carbolic acid has been the favourite remedy "as it is portable and easily administered but it is doubtful if it has much effect."

In December last, when on tour, Major Walker was able to try the drug on two cases of rinderpest that came under his notice, and the results were so favourable that further experiments were carried out under his orders.

With regard to the original cases it suffices to say that one animal was a young male buffalo with all the typical symptoms of rinderpest except diarrhœa. One dose of ½ dram of permanganate of potash dissolved in 5 pints of water was administered. The animal appeared to derive immediate benefit and quickly recovered. The second case, a valuable bullock, had diarrhœa in addition to other characteristic symptoms. This animal recovered after one dose of ½ a dram of the drug in a gallon of water. Other cases occurred which were successfully treated. In one case a bullock, 1½ drams of the drug were administered. Other cases were tried in the Punjab, with such satisfactory results, that the villagers gained such confidence in the treatment that they asked for it, and eventually consented to have their remaining animals inocculated with protective serum to which they had been much opposed originally. There is also Haemorrhagic Septisaemia (caused by a germ in the blood which produces this disease). The symptoms, by which this fell disease is recognised, are off feed, throat swollen, discharge from eyes and nose, respiration accelerated. The usual mortality attacked by this disease in India is between 90 and 100 per cent. but cases have been treated successfully and hopefully, with a solution of permanganate of potash. It is probable that buffaloes, which are more susceptible to this disease than cattle, will be found to require a larger proportionate doses than cattle. The drug is given in large quantities of cold pure water acidulated with vinegar as in the rinderpest cases. With cattle and buffaloes in rinderpest from 1 to 2 drams is the usual dose; but in Haemorrhagic Septicaemia from 1 to 3 drams of the drug are given in the case of buffaloes.

No definite conclusions can be drawn from these experiments as they are in their infancy, but they are well worth a trial. It remains to be seen if the best results are to be looked for from one large initial dose; or from repeated moderate doses. In the case of Haemorrhagic Septicaemia there is rarely time for more that one dose. As it requires special skill to perform hypodermic injections, it is better to administer the solution by the mouth. The native agriculturist is conservative in his obstioncy in accepting new treatment for his cattle, but if it is proved to him that medicinal treatment is doing good when disease is actually prevalent, he is ready to accept it, but requires immense persuation (and that not always successfully) to take protective measures.

COFFEE.

Last week we published an account of the Coffee Roasters' Convention in New York and we believe that everything dealing with the Coffee Industry must be of interest to all coffee planters of Southern India, especially when in the near future they must expect more competition, and would like to know from what other countries, such competition is likely to arise. No one can foretell when Brazil, alone, will produce another record crop, sufficient to supply the world's demand, and necessarily bring down the present high prices, to the level of a few years ago. With the present prosperity in Coffee, planting is extending. Now is the time to provide for the inevitable day of low prices, by economy in cultivation, by selection of seed, and by the unstinted help and advice of the Scientific Department. The following Report is by the Governor of Porto Rico.

Promoting Porto Rico Coffee in the United States.

"The coffee crop of 1912 (in Porto Rico) was the largest in the history of the industry and sold at profitable prices, substantially a third higher than those of the years 1909-10 and several years preceding it. The value of coffee sold abroad during 1911-12 was $6,754,913, furnishing one-eighth of the receipts from foreign commerce. With the prosperity attending this industry, it is being extended throughout the mountains of the island, the soil and climate of which are especially adapted to the successful culture of the highest grades of coffee to be found in the world. Heretofore this product has gone principally to France and Cuba, where it is highly prized by the connoisseurs of those countries. Porto Rican coffee has never been known commercially in the United States because first, it commanded a ready market at the highest prevailing prices abroad, and, second, the small quantity sent to the United States has not been placed upon the market in form to be identified. It is now, however, being introduced into the American market through the commercial agency of the Government of Porto Rico at 569 Fifth Avenue, New York, and may be purchased of the principal grocers of New York City in hermetically sealed tins under the special guarantee of the Porto Rico Association. The Government has taken an active interest in this undertaking, through its commerce commission, in the belief that if it were known that one of the finest coffees produced in the world is grown on American soil it would be appreciated by American consumers looking for the best, and find a steady demand in the home market where it will not be subject to foreign tariff caprice."

A New Coffee Zone in Brazil.

The Rio Janiero Correspondent of the London *Economist* writes :—

"In the course of the next few years the output of coffee will be increased by the production from a new coffee zone situated in the State of Parana. The lands for its cultivation are located in the Paranapanema, Tibagy and Ivahy valleys, covering an extension of about 1,600 square leagues and bordering on the State of Sao Paulo. The climate is favourable and the land consists chiefly of the rich "terra roxa," or red earth, so eminently suited to coffee cultivation.

The districts of Jacarezinho and Ribeirao Claro contain at present about 1,200,000 coffee trees, of which nearly 50 per cent. have already attained the necessary producing age. According to official advices, the present crop will not be large, and it is anticipated that practically the whole production will be consumed locally, but in four or five years time there should be a good surplus for export, as the total number of trees planted by the end of the current year will amount to about four millions. If sufficient labour were obtainable this figure might have been exceeded, as considerable interest is being manifested in this new district, and land is being bought up rapidly at relatively reasonable prices. There is no doubt a promising future in store for the district, and as soon as railway communication is available its value will be enhanced considerably. The Sorocabana Railway so far only serves a very small part of the zone, but extensions are shortly to be constructed which will tap that section of the State effectively."

Consular Agent S. H. Wright, at Medellin' says that coffee is quite extensively grown in the districts of Fredonia, Caldas, Abejorral, Angelopolis, Heliconia, Titibiri, Ituango, Penol, San Carlos, San Roque, and San Luis of that Department. The principal merchants and commission houses of Medellin export the product. Statistics regarding production, acreage, etc., he says, are impossible to obtain. The exportation for the year 1910, the latest statistics available, amounted to 100,378 sacks, less than for the three ptevious years. However, the actual acreage is increasing and this is an important industry now.—*The Spice Mill.*

Costa Rica's Important Coffee Industry.

From a contribution on "Costa Rica's Exports" by Lincoln S. Cornish, we take the following anent coffee:--

Coffee was exported from Costa Rica last year (1911) to the extent of 206,609 bags. On the beautiful uplands of this republic is grown some of the very finest coffee which all the Americas produce—and that is saying a good deal. It fetches top prices in the European markets, which are the chief appreciators of this delicious but high-priced Central American coffee. It is said that the United States will not pay the price for high-grade coffee, purchasing instead the less aromatic Brazilian bean.

Whether this is the reason or no, the fact remains that the United Kingdom and her colonies took last year 81'98 per cent. of Costa Rica's coffee. The United States took but a small fraction; to be precise, exactly 8'06 per cent. of it; Germany bought 7'67 per cent., France 2.16, while all other countries disposed of the 0'13 that remained. Of course, this 207,000 bags of Costa Rican coffee does not mean the entire product; a large quantity is consumed annually in the country, where every tiny adobe or cane dwelling in the most rustic village has its materials for making an excellent cup of coffee.

Limon is the chief shipping point for coffee; from this port went 191,314 bags. Punta Arenas accounting for only 76,284 bags.

The proportion of coffee shipped in the husk is large, amounting to 63'07 per cent. of the total. There has long been an entirely unreasonable preference on the part of European buyers for a brightly coloured been, and this effect is better produced, when the coffee is shipped in the husk and cleaned (by removing tbe inner case covering the two beans, and washing and polishing them) in Europe. London maintains enormous cleaning apparatus to treat coffee shipped in the husk, which is there "made pretty" for the buyers. This prejudice is now yielding to reason, which declares that it is more economical to clean the coffee on the spot in Costa Rica, as freight is then less and labour is cheaper; also it has been demonstrated that the cleaned bean loses nothing of its flavour in transit, although it does not reach the London markets with so bright an appearance. Buyers have lately taken to judging coffee by its flavour instead of its presentment in the sample trays, with the result that an increased quantity of coffee cleaned in the beneficios of Costa Rica is likely to be shipped annually.—*The Spice Mill.*

Coffee at Havre.

The *Spice Mill* publishes a long article (a portion of which we extract) on the Coffee Trade of Havre, which is the principal coffee port of Europe, from Consul John Ball Osborne, Havre, France, who writes on the above subject as follows:—

The retail prices for this great staple being a matter of concern to millions of consumers, information in regard to the important commercial transactions of this market should be of general interest, since they exercise considerable influence in the establishment of prices throughout the world. The people of the United States are more concerned than any other nation in view of the fact that their consumption of coffee is far in excess of other countries. It is estimated that in 1911 the United States consumed 853,066 000 pounds of coffee, or a per capita allowance of 9 pounds, while Germany, which is next on the list, consumed only 375,883,000 pounds, or a per capita of less than 6 pounds.

DISTRIBUTION OF THE WORLD'S SUPPLY.

According to statistics compiled by the Syndicat du Commerce des Cafes of Havre the total visible supply of the world on October 1, 1912, was 12,161,000 sacks of 110'23 pounds each: distributed as follows: Europe stored in Havre, 2,108,000; Hamburg, 1,472,000; Antwerp, 901,000; Netherlands, 320,000; Trieste, 307,000; England, 245,000; Marseilles, 123,000; Bremon, 106,000; Copenhagen, 77,000; Bordeaux, 46.000; total, 5,705,000 (of which 4,583,000 sacks were Brazilian coffee); *en route* to Europe, 823,000; total for Europe, 6,528,000. United States—stocks, 2,058.000; *en route*, 591,000; total 2,649,000 (or which 1,742,000 sacks were Brazilian coffee). Brazil—stocks at Rio, 355,000; at Santos, 2,609,000; at Bahia, 20,000; total 2,984,000.

The commercial movement of coffee at Havre during the period from January 1 to October 11, 1911 and 1912. respectively was as follows, in sacks; 1911—imports, 897,049, exports 1,215,621; 1912—imports 1,076,788 exports 1,286,965.

VALORISED COFFEE AT HAVRE.

The relation of Havre to the valorization plan of the Brazilian Government is important. A quantity equal to more than half of the 4,800,000 bags of coffee purchased by the Brazilian States when the system was inaugurated has been held in bond in Havre and Marseilles since 1907 by the valorization Committee. The bulk has been stored at this port. The amount held here on December 31 of each of the last four years and on October 15, of the current year was: 1909, 1,841,000 sacks; 1910, 1,751,576 sacks; 1911, 1,526,000 sacks: 1912, 1,311,600 sacks.

It will be seen from the foregoing that the local stock of valorized coffee has been reduced since 1909 by 529.400 bags, or 28'7 per cent. It is stated that this reduction represents the actual sales and not transfers from one entrepot to another. It is a curious fact, however, the two shipments were made from this port to the United States during the past summer, one consisting of about 60,000 bags and the other about 40,000 bags, the two being valued at something over $2,000,000. These shipments were made by a banking institution which had advanced a large sum of money on the valorised coffee. There is no question that if a large part of the stock on hand were suddenly put on the market the prevailing high prices would be materially reduced. When the coffee is withdrawn for sale the import duty, amounting to 11'9 cents per pound, must, of course, be paid.

(*To be continued.*)

RUBBER.

Dr. Huber's Report.

[*Continued.*]

In continuing Doctor Huber's Report two points stand out prominently, one the question of Labour, and the other the exhaustion of rubber trees. The former is the more difficult of solution. But more labour he prophecies will be required. The latter will, doubtless, be solved by experiment.

EXPORT FIGURES.

The total exportation of the Eastern producing countries, in 1911, was close to 15,000 tons of rubber (Ceylon and Malaya together 13,400 tons.) It is calculated that the production of 1913 (1912 ?) will be 25,000 tons. The calculation of future production are naturally subject to numerous, causes of error. For Ceylon and Malaya there exist, however, prophecies based on figures more secure and an experience of some years. From 1905 to 1911 the production of these two countries was follows :—

		Ceylon. tons.	Malaya. tons.	Total. tons.
1905	...	75	130	205
1906	...	146	430	576
1907	...	248	885	1,133
1908	...	407	1,629	2,036
1909	...	666	3,340	4,006
1910	...	1,601	6,504	8,105
1911	...	3,194	10,700	13,394

The estimates of future production, in the next few years are as follows for the same countries ;—

1912	...	6,500	17,400	23,900
1913	...	10,000	28,600	38,600
1914	...	17,000	38,700	55,700
1915	...	20,000	49,800	69,800
1916	...	...	59,400	...

The figures referring to Ceylon are taken from the Ceylon Directory of 1911 while those with respect to Malaya were calculated by C. C. Malet and published in the *Straits Times* of March 21st, 1912.

By my calculations for Malaya alone I arrive at the following figures :—

	Tons.
1912	20,000
1913	32,000
1914	45,000
1915	60,000
1916	70,000

That this prophecy is not much exaggerated is evinced by the fact that Mr. Lewton-Bain, Director of Agriculture of the Federated Malaya States, estimated the production of Malaya in 1916 at, 65,000 tons, taking as a base an area of 360,000 acres only. Considering that the actual area of plantations in the Malaya Peninsula amounts to half the total area of the plantations in the East, it is easily comprehended that the estimate of 100,000 tons as the production of all the plantations of the East is not exaggerated.

These figures naturally suppose a normal development of the plantations and a continuation of the intensive processes for an extraction of latex. It is possible, however, that these may be modified in the sense of a more prudent exploitation of the trees which could easily reduce the production 10 to 20 per cent.

LABOUR RECRUITING.

Labour is abundant and cheap on the Eastern plantations. It is true that in the Malaya Peninsula, where the plantations have a greater development, the recruiting of labourers encounters certain difficulties on account of the small resident population, the introduction of coolies from the three neighbouring regions more densely populated being necessary—from India meridonial, China and Java. In a similar situation is the Island of Sumatra which imports coolies from the neighbouring Island of Java and China. Even the populous Island of Ceylon imports the larger part of its rural workers from India. Only Java is completely independent of the introduction of foreign coolies, getting from its own population of 30,000,000 inhabitants a class of cheap labour although a little unstable. On this Island the days wages of a coolie corresponds to 300 reis of our money (about 11c gold appr.), while in Ceylon the Tamil coolie receives 350 to 400 resis (about 12 to 13½c gold appr.) per day and in the Malaya Peninsula, where wages are higher, wages are paid at the rate of 450 reis to 1,000 reis (13½c to 33c gold appr.) and in exceptional cases (Chinese labour) up to 1,800 reis (59c gold appr.). It is not impossible that these wages in the future may further increase a little, due to the large demand there will be in the next few years to complete the force of workers on the plantations. However, the general opinion is that when the plantations are completed the work is so easy and congenial to the indolent Asiatic coolie that their influence will be sufficient to prevent any great advance in the cost of labour.

FUTURE OF THE PLANTATIONS.

It would be possible to believe that the notable precocity of the rubber on the Asiatic plantations produced principally by the exceptional conditions of intensive culture will cause, as a consequence, premature exhaustion of the vital forces of the trees. Meanwhile, it does not seem to me that from this will result a serious menace to plantations. Also the cryptogamic troubles, notwithstanding that they constitute a constant danger to the planting industry, have up to the present been effectively combated. The greatest danger to the Asiatic plantations is in their intensive exploitation (stimulated still by the decline although slow, but inevitable of prices,) which sooner or later must cause the exhaustion of the trees. This exhaustion, manifesting itself scarcely now in small areas, planted 10 to 20 years, as yet exercises little influence on the total production, especially as the areas now arriving at the producing stage are much larger and the general tendency is to advance as much as possible the time of tapping the new trees. To cite but one example, 10 years ago the production of one kils (2 2 lbs) of rubber per year was only expected from trees 10 years old at least while this same quantity is now taken from trees six years old and in exceptional cases even from trees 4 to 5 years old. Therefore we need not be surprised if the production in the next few years exceeds general expectation. It is, however, possible that at the end of some years the premature exhaustion of the trees will make itself felt with more intensity, and that large areas may have to be submitted to a period of repose more or less prolonged. The necessity of opening new areas to replace the failure thus produced is already admitted by many planters of large experience.—*The Weekly Times of Ceylon.*

The Planters' Chronicle.

RECOGNISED AS THE OFFICIAL ORGAN OF THE U. P. A. S. I., INCORPORATED.

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THE U. P. A. S. I.

(INCORPORATED.)

Contents.

We have been compelled through want of space to keep over till the next issue the continuation of Consul Osborne's report on the position of coffee at Havre.

An interesting report, through the kindness of the Government Entomologist, on Bees and the Fertilization of Coffee is published, and we hope that Bee Keeping will become common amongst planters, seeing how invaluable their aid is in fertilizing the flowers. The production of honey will have to be a secondary consideration.

The Scientific Officer publishes an article on Methods of applying manures, and advocates, with unanswerable reasons, the broadcasting system.

We publish under the heading of Correspondence a letter from Saklaspur, which we trust is but the *avant courier* of others from other planting districts.

Under the heading of the Labour Question, two letters are printed, which do not, however, throw much light on the subject, as they are more particular than general. The horizon of the writers is too limted. We want letters that shall benefit the whole planting community - not one particular locality.

A good deal of attention is being paid to the opening of land by means of explosives, and we have the pleasure to publish a letter from an old Mysore planter on the subject, and shall hope to revert to it again when more data are at our disposal.

It is with great pleasure that we publish the fact that Mr. Anstead our Planting Expert, has been nominated to a seat on the Board of Agriculture. Originally consisting of 38 members the Board has been increased to 55. The well merited honour conferred on Mr. Anstead will be welcomed by all members of the Planting Community, as a recognition of the good work done by him in South India.

Next week we shall publish a circular from the Indian Tea Association asking all Tea Companies and Proprietors to print the words "Pure Indian Tea" on their Tea chests next season. It will serve not only to draw attention to the purity of Indian Tea but act as valuable means of advertising.

BEES AND THE FERTILISATION OF COFFEE

[*Continued.*]

Report of the Government Entomologist on a tour in the Shevaroys.

" I left Headquarters on the evening of 13th October, arriving at Salem the same night and proceeded next morning to Yercaud. Here I examined some coffee and in the evening went on to Hopeville Estate.

" On 15th I visited Kadiar Rocks, a high rocky cliff to which the wild Bees (*Apis dorsata*) suspend their combs, whence a large quantity of honey and wax is collected yearly. In the evening I visited Arcadia Estate, where a few colonies of *Apis indica* have been kept in English hives, but unfortunately these had all swarmed and deserted the hives just prior to my visit. Investigation of the combs showed that Wax Moth (*Galleria mellonella*) had effected an entrance. (See *Agricultural Journal of India*, October 1911).

" On 16th I observed flower-haunting insects and did some general collecting, visiting Swinton Estate and Scotforth Estate, to see local conditions and make general observations on insects.

" On 17th I proceeded to Valalakadai Peak Estate, collecting and observing in the intervening country.

" On 18th I observed flower-haunting insects, gathered information regarding bees, and saw and advised on various pests of Coffee, Orchard and Garden Crops. It was a wet misty day very unfavourable for collecting or observing insects. At about 6-30 p.m. a sharp earthquake shock, lasting about 1 second, was felt here.

" One 19th, as the N. E. Monsoon seemed to have set in and it was misty and raining hard, I left for Yercaud, reaching there the same afternoon.

" On 20th (Sunday) I halted at Yercaud. It was a misty, wet, cold day and few insects could be found but I was able to obtain several interesting species.

" On 21st it was still wet and unfavourable and I left in the afternoon for Salem and arrived back at Coimbatore on the morning of 22nd October.

" Three species of true Honey-Bees (*Apis dorsata*, *indica*, *and florea*) appear to occur in the Shevaroys (I omit consideration of a fourth reported species, which is evidently a *Melipona*). Of these I was unable to come across a single specimen of *Apis florea*, and neither of the other two species was at all common. The absence of Bees in these Hills at the time of my visit was indeed remarkable. During the last three or four days the weather was, it is true, extremely unfavourable, yet even this would hardly account for the almost total absence of bees, and I am inclined to suppose that *Apis dorsata* (and perhaps *A. indica* also) migrate from these Hills into the Plains during about July-November. This would be in accordance with the habits of *A. dorsata* elsewhere (notably at Sabour, in Bihar, as Mr. Woodhouse has informed me) but further observations are desirable, as the point is of course not only interesting from a bionomic viewpoint but also of practical importance in considering the damage to these bees caused by the present methods of collecting honey and bees wax.

" The right to collect these is leased out by the Forest Department, usually to Malayalis living in adjacent villages. The Bees (by which I refer to the large Rock-Bee, (*Apis dorsata*) suspend their large single combs from the lower surface of inwardly sloping rocks which occur usually as high cliffs rising for 200 or 300 feet. As these combs are usually affixed to overhanging rocks near the top of such a cliff, the honey-gatherers generally climb down by a rope ladder fastened from the top. Occasionally the ladders break, or the gatherers are so badly stung that they loose their hold and drop, being dashed to pieces on the rocks below. They are provided with a blanket and a torch, with which they burn the bees off the combs, which are then cut and collected. The destruction of bees by this process, which takes place in May-June, is enormous, as I am informed by all observers. At the same time, I am doubtful whether the honey and wax could be collected without the destruction of the bees, which would otherwise pursue the plunderers of their stores and exact full vengence on their disturbers.

"*Apis dorsata* seems to be a fierce and intractable bee whose habit of building a single large comb unfits it for domestication. Its migratory habits also, if these are established, form an obstacle from an apicultural viewpoint.

"*Apis indica*, a bee rather similar to, but smaller than, the English-Honey-Bee, builds its nest as a rule in hollow trees, where it forms several parallel combs. It can be hived, although it is very subject to attack by Wax-moth whereupon it usually deserts the nest and swarms off elsewhere, so that it is rare to induce a colony to remain in one hive for more than a few months. The ordinary English Bar-Frame Hive and Foundation Comb, being made to suit the larger European Bees, are hardly suitable for *Apis indica*, whose combs are smaller, averaging about 35 cells in 6 inches, whereas European combs run to about 27. This difficulty may be overcome by the use of specially-made Foundations and I am writing to Colombo to make inquiries regarding the availability of such for Indian Bee-keepers, as I understand that the Ceylon Agricultural Society has recently obtained a Foundation Machine specially built to suit *A. indica*. This bee offers the most likely subject for trial in domestication amongst the native Indian Bees, although, as remarked above, it is not altogether satisfactory. It is at times rather a vicious species, resenting interference and manipulation, and that also is a point against asking Coffee Planters to endeavour to domesticate it. I presume that its Honey and Wax are covered by the term "Forest Products" but I am unaware whether collection of products of this variety is included under the Licenses granted by the Forest Department. In any case, it would prove most difficult to enforce protection for this bee, as it builds almost anywhere in the jungle wherever a suitable hollow tree is to be found and is not confined to special localities as is the Rock Bee.

"*Apis florea* occurs in the Shevaroys by all accounts, although I saw none at all. It builds a small single comb rarely more than six inches broad by twelve deep (often smaller) and is quite unsuitable for domestication. It usually hangs its comb from a branch of a bush, where it is easily found and taken and this habit renders it (like *A. indica*) very difficult to protect by any legislation. It is, though small, a most active little worker and must do a great deal of good in the pollination of flowers. Its store of Honey is so small that it is not likely to be taken for commercial purposes but would doubtless be secured for present eating by Jungle Tribes.

"Although very few bees were to be seen at flowers by day, in the evening numerous moths, notably *Nephele hespera* and *Protoparce convolvuli*, were attracted, whilst in the daytime *Macroglossum spp.* also darted around the blossoms. It will of course be necessary to determine by actual experiment and observation, when the coffee flowers next April, what proportion of flowers are actually fertilised by Bees, but I rather expect to find that other insects (such as the Sphingids named above) will be found to have a large share in fertilizing them.

"Green Bug (*Lecanium viride*), which was first noticed in the Shevaroys about six years ago, is now widely distributed. In no part, however, does it seem to be doing really virulent harm such as I saw in the Anamalais in January last, and in many places it seems to have disappeared (or practically so) from the patches on which it has occurred. Doubtless climatic conditions have a good deal to do with the difference in the amount of damage it does to coffee. Probably it was introduced into the Shevaroys with Fruit-trees or Garden-plants. In this connection it may be noted that, when touring by rail, I often see at Railway Stations consignments of plants and young trees, (Mangoes etc.,) beiny sent by rail and that it is very rarely indeed that I am unable to detect Scale Insects or other pests being carried with them.

"Coffee Borer (*Xylotrechus quadripes*) occurs commonly in the Shevaroys but apparently does not cause any great damage. It is dealt with by cutting out the affected parts.

"Root Rot attacks the Coffee trees in many parts and is doubtless attributable to the large quantity of dead and decaying wood which lies about almost everywhere.

"*Hemileia vastatrix* is common, especially around Yercaud. I found a minute yellow larva (apparently Dipterous) which was apparently feeding on the spores, but unfortunately the specimens collected all died. This would perhaps repay further investigation."

Note.

In Scientific Officer's Paper No. 115 in the last number of the *Chronicle*, on the subject of Bees and Coffee Festilisation, the following corrections should be made:—

p. 27, last line but one, 'active bee' should read *native bee.*

p. 28 line, line 9, '1911' should be *1912.*

The Government Entomologist has kindly contributed the following comments on this Paper:—

"It is not strictly accurate to say that no native bee 'will live in captivity in any form of hive.' This is more or less true of *Apis dorsata* (Rock Bee) and *A florea* (Little Bee), but *Apis indica* will live in a hive for some time. The trouble is that it will not (as a rule) settle down in a hive permanently, but usuallv swarms off again after a few months' occupation of the Hive. A Bee-keeper, however, who takes a little trouble with his Bees should not have much difficulty in keeping (say a dozen) hives occupied as they will not all swarm at once and, by keeping a look-out for wild and escaped swarms, new colonies can be got to take tbe place of those that have flown off. *As a honey-producer* I should not recommend *Apis indica* (Mr. Oakes tells me, for example, that he only gets about 6 lbs. of Honey per Hive per annum), but *as a pollinator*, it should be well worth keeping in all Estate Districts where either Coffee or Tea is grown. Mark that I said in my paper (which you quote) that the recommendation was addressed to 'would-be bee-keepers *in the plains*,'"

THE SCIENTIFIC DEPARTMENT, U.P.A.S.I.

Methods of applying manure.—A Correspondent has called attention to the fact that differences of opinion exist among planters as to the best method of applying manure to coffee. Some spread the manure on the surface of the ground in a circle round the tree corresponding with the ends of the branches and approximately some four inches wide, and this is covered with refuse and leaves lying near by. Others consider this method of applying manure is insecure on any but flat land and consider the risk of loss by wash a serious one, and they cover the fertiliser with three or four inches of earth.

In order that plants may get food from the soil in which they grow it must be dissolved in water, and in a soil in which this plant food is finely divided and evenly distributed the roots of the plants will have a much better chance of getting the majority of the food than in a soil where this is not the case. As a general rule, therefore, it is best to broadcast all fertilisers and lightly work them into the top two inches of the soil. Where there is a good mulch of leaves these should first be swept up into heaps round the stems to the trees. During this process the ground should not be scraped and the half rotten mulch mixed with the roots and soil should not be disturbed. On the swept surface between the rows the manure should be broadcasted and spread as evenly as possible. The leaves should finally be spread back over the fertiliser and soil as evenly as possible. Where there is no mulch the manure should be evenly broadcasted and lightly worked into the top soil with a mamotty fork. These methods of applying manures will give better results than applying them in eyebrow pits or trenches, or any other method of local application. Manure thus applied is apt to remain in the same condition in which it was put out for a long while. In the case of Lime and Basic Slag, and fertilisers which are required to have a physical as well as a chemical effect upon the soil, it is absolutely essential that they should be as evenly and widely distributed as possible. Again the more insoluble the fertiliser is the more need there is for mixing it with the soil as much as possible. Soluble fertilisers are dissolved by the dew and rain and travel in a dissolved state for some distance through the soil before they meet with some substance which acts chemically on them and 'fixes' them in the soil. Thus a soluble fertiliser like Superphosphate, for instance, is more likely to become intimately mixed with the soil by natural means than Bone Meal, for instance, which should be spread over the surface in order to become mixed with the soil by subsequent cultivation.

There may be special cases of course where broadcasting is not possible, such as on very steep hill sides, but even here if the land is properly treated to stop wash and conserve the top soil by means of contour drains and cover crops, broadcasting manure is quite feasable and little risk of loss is run. Probably the most general exception to the practice is in the case of young plants with a limited root range when it may be advisable to apply the manure near the plant where its roots can reach it. As a general rule, however, broadcasting and even broadcasting of manures is the best method of applying them.

Fixation of Fertilisers by the soil.—When a fertiliser is applied to the soil it does not simply remain mixed with the soil unaltered, but a chemical reaction takes place between the fertiliser and the soil. There is a general tendency for the soluble matter of the fertiliser to undergo a chemical change and become insoluble. This process is known as ***fixation***. To take an example, if a solution of sulphate of potash is allowed to percolate through a column of clay the solution draining out at the bottom of the column will contain scarcely a trace of sulphate of potash, but instead will contain an equivalent amount of sulphate of lime and other sulphates. The element Potassium in the sulphate of potash has been replaced by the element Calcium and as a result of this exchange an insoluble compound of potash is formed and retained in the soil. The potash compounds in fertilisers readily undergo fixation, the sodium and calcium of the soil being replaced by the potassium of the fertiliser. Fixation of potash occurs mainly in the surface soil where it is held in forms insoluble in water, but soluble in dilute acids and so available to the plant. This process of fixation renders the potash well distributed in the soil and this is one of the reasons why soluble fertilisers often produce such good results. It will be noted that fixation takes place at the expense of the calcium and other alkaline elements in the soil which are lost by drainage after they are replaced by the potassium. It is in this way that a soil under cultivation to which fertilisers are constantly added gradually loses calcium and is apt to become acid. Hence the need for adding lime occasionally to soils not naturally well stocked with it, and the presence of this lime, as seen above, is extremely important, and absolutely necessary if fertilisers like potash are to be retained by the soil and prove beneficial.

Nitrogen in the form of nitrates cannot undergo this process of fixation because all the ordinary forms of nitrates are soluble in water. These fertilisers like nitrate of soda are apt to be washed out of the soil and lost in the drainage water. If saltpetre, which is a nitrate of potassium, be added to the soil, the potassium undergoes fixation but the nitrate does not, calcium and sodium nitrates being formed and these being soluble escape in the drainage water. From this it will be seen that fertilisers like nitrate of soda and saltpetre should not be applied to the soil before a time of heavy rains or the nitrates will be lost. They should rather be applied at a time when the soil is wet and no heavy rains are expected so that the plant roots will have a chance of obtaining the nitrates before they are washed out of their range.

Phosphates readily undergo fixation by combining with the aluminium and iron compounds in the soil and forming insoluble phosphates. These compounds are sometimes so insoluble that the phosphate becomes unavailable to plants and this happens more especially in the absence of lime, the application of which sets the phosphate free.

If very heavy dressings of potash and phosphate are applied to the soil what is not utilised is the first few years may undergo fixation to such an extent that it becomes unavailable as plant food, more especially if the soil contains much clay. Hence it is best to make light and frequent applications of fertilisers and not very heavy ones at long intervals.

Cattle manure aud all kinds of manures alike undergo this process of fixation which indeed regulates the supply of plant food in the soil, and in studying the action of different fertilisers upon the soil the products of fixation are of prime importance.

Kalisyndicate Manurial Experiments,—Mr. Birnie, the Kalisyndicate representative in India who has succeeded Mr. Friedrichsen, is at present on a short tour in Coorg with the Scientific Assistant making final arrangements about the Experiment Plots there. From Coorg he will proceed to Mysore on a similar mission.

R. D. A.

DISTRICT PLANTERS' ASSOCIATIONS.

Anamalai Planters' Association.

The Minutes of a Meeting of the General Committee held at the Puthutotam Bungalow, at 3 p.m. on Saturday, 14th December, 1912.

PRESENT.—Messrs. G. A. Marsh (Chairman), E. W. Simcock, B. A. Marden, C. R. T. Congreve, C. Howland and J. Hatton Robinson (Honorary Secretary).

Agenda.—Roads and Communications, Electric Rope Way, etc , Non-Service of Warrants, Customs Duty on Machinery for Tea, Coffee Rubber, &c., U. P. A. S. I. Representative on the London Chamber of Commerce, Hospital Affairs, Weekly Rice Issues.

1. *Wire Rope Way.*—The Committee were very thankful to Messrs. Barber and Pascoe for what they had done in the matter and Messrs. Walker Sons & Co's offer was accepted with thanks. On Messrs. Walker Sons & Co., putting in a rough estimate other Firms might be consulted.

2. *Non-Service of Warrants*—In reply to Mr. deSalis' letter of 26—10—12, and his proposed resolution under this heading it was resolved "That this Association does not consider it advisable to do anything on the matter of his resolution until the resolution which the U. P. A. S. I. now have before Government is definitely dealt with, but, at the same time, Mr. deSalis' resolution will by no means be lost sight of."

3. *Customs Duty on Machinery.*—This Association strongly supports the movement of the U. P, A. S. I. that all machinery required for Coffee, Tea or Rubber work be made free of Customs Duty.

4. *U. P. A. S. I. Representative on London Chamber of Commerce.*—It was resolved: "That this Association records a hearty vote of thanks to Mr. John C. Sanderson for his services and that it agrees to Mr. Guy Owen taking his place, but thinks it might be advisable if the services of one of the late well known retired South Indian planters could be got to assist Mr. Owen in his duties."

5. *Hospital Affairs.*—The correspondence between Mr. Simcock and the Honorary Secretary was read. Mr. Simcock's offer to let the Sub-Assistant Surgeon remain on in the Stanmore Bungalow was recorded with thanks. The Honorary Secretary was requested to ascertain by whose permission the Medical Officer had lately left the District, and if the same is in order, that this Association respectfully request that intimation be sent to the Honorary Secretary about his leaving the District in future.

6. *Weekly Rice Issues.*—It was unanimously agreed that the weekly issues of rice are not to exceed Re. 1 for a man cooly and 12 annas for a woman.

(Signed) J. HATTON ROBINSON,
Honorary Secretary.

CORRESPONDENCE.

Saklaspur, January 17, 1913.

The EDITOR,
The *Planters' Chronicle.*

Dear Sir,—I have just read your Bangalore Notes in this week's *Chronicle*—I hope you will continue to give them in each future number. The pages of your paper are *so dry*, still they don't even give me a thirst (for more). Medicine no doubt, and the best of its kind, but it wants something to help it down. A few more numbers and I shall be like some of my neighbours and not take off the wrapper. At present I do open it, but glance at the advertisements first. Do brighten it up a bit.

I strike while the iron is hot, and send you a little local gossip. I am no scribe, but anything to keep the ball rolling. I hope you will agree with me that something is better than nothing—so here goes. My feeble attempt may induce some other novice at this job to do likewise.

LOCAL CHAT.

WEATHER.—December passed off without giving us a single fright, as far as I can remember, only *one* cloudy day. May we get through the remainder of this month and February in the same style. The east wind has been the very d—l,—the most livery ones know all about it. They are unpleasant company on a real bad day.

CROP.—On nearly all estates is half through, and as far as I can gather most of my neighbours are doing their estimate or a trifle over. Prospects for next season are grand.

Local buyers are evidently sitting pretty tight. I have not heard of any offers. One merchant, who only a short while ago retired from his business in Saklaspur to settle in Madras has returned, and from the letter he writes, he is prepared to buy black—broken and "chickloo"—Great man ! !

CARDAMOMS have been putting money into the pockets of the lucky men who grow them —Rs.70 to Rs.75 is the price now obtainable per maund (28¾ lbs). I wish I could find an easy method of filling the few I grow with shot.

One hears quite a lot of talk about the Coorg-Liberian Hybrid—a splendid thing to put down in one's bad patches where the Coorg supply is hard to get on, I advice those who have not already tried it, to buy a seer or so. In a few years it will be a case of "everybody's doing it now," So don't say I did not tell you.

My condolences with the friend who a few days ago when riding round his estate watch at about 12 p.m. came off whollop, had he been dining out ? Horrid thing having to go round one's night watch—I hated doing it so, that I gave up night watchmen five years ago.

We have just had a visitor through the District—Mr. D. Lyall Grant, Many planters no doubt have had the pleasure of meeting him at the offices of Messrs. T. H. Allan and Co. I had not, but next time I arrive at Tilbury I shall make a "bee line" to renew his acquaintance. How I enjoyed his visit to us—better than any tonic—a host of good stories.

I trust, Mr. Editor, that you will have the good fortune to meet this gentleman when he passes through Bangalore—if you do— ask him about a dog—he will then tell you of great doings.

MOTORS AND ROADS.—I advise anyone who may have to motor through these parts to make enquiries about the roads. Kadur District is not alone in the matter of bad roads.

It is quite the usual thing now when two or three men get together for a "buck," that the "talky talk" is about ' Carburetters—Ignition, Sparking plugs etc., and not "shop"—for anyone not interested in motors I should say "shop" is preferable—as most of the former must be "double Dutch." I overheard the following conversation the other day—" How's your pulper running ?" " Oh pretty well, over-heats a bit." A sure case of "bloater" on the brain. A motor bike I know of has caused its owner many small sums in bets on whether it will start or not.

The other morning I believe he dropped 20 "mouldy's" at one fell swoop - the beastly thing jibbed—though I heard he got his 20 back doubly that same day somewhere about midnight—when properly filled with spirit—the tank of course—and then rode in and out of his drying ground "barbacues" showing how to negotiate hair-pin bends—evidently learnt a thing or two since his 300 mile ride round the Island. The same "bykist" told me, the other day his belt broke, and at the same moment he ran over a 12 foot tank snake killing it, having killed he caught it (good enough for one of John Bull's Biscuits) fixed in his belt fasteners head and tail, and sailed home. He now talks about a patent and fortune. Tank snake non-slipping motor belts—guaranteed to bite, non-poisonous. Another case of something on the brain—What ! What ! !

Cannot Mr. J. G. Hamilton be induced to write an article for the *Chronicle* about his African tour ?

What's happened to the Busanhalli Bard ? He brightened up one number of the *P. C.*

ANTEDRYROT.

The Labour Question.

Dear Sir,—I personally, and I think most of us in these parts, am not a convert to a Raise of Wages, though I see the argument of your correspondent of 11-1-13. I don't see the necessity.

With a long experience of Mysore, I don't for a moment think Emigration is hitting us as hard as the Law ; especially as translated in Mysore.

Mysore planters are differently situated to most planters if not all others in South India—and as cases under Act XIII are adjudicated on by half a dozen different magistrates—some follow the Law which is never clear and the others are a Law unto themselves. The cooly or maistry and his vakil know how to pitch their tale accordingly.

In Mysore we need a European Magistrate for these cases at least. *No Amildars* try and convict their own villagers. Patels and Shanboges stroke them the right way, and the prisoner is never punished. I believe the law and its very free translation do us more harm than all the Emigration cases. One cannot help putting some faith in it, and agents and non-resident Proprietors throw it at you, hence we give far larger sums than are at all necessary, or than we should tempt with the class of men we generally advance.

We've no definite readings as to what constitutes a running account. I've found 2 as. batta and 9 as. toddy debt make a running account—again a man took Rs.50 for coolies to come in a week. 6 months later he was accidentally met and handed to the Police; although his stamp paper was *an entire misrepresentation*, as a friend paid the debt, he was released.

We want a more summary way of getting these questions settled—I am due to-day as a witness at the 8th hearing of a case for Rs.26 and the case will go by my default. I feel it and *it is very derogatory.*

Yours faithfully,
OLD MYSORE.

North Mysore,
January 17th, 1913.

Labour Difficulties.

Sir,—I am glad to see discussion on this important subject has been started. It may perhaps help the Labour Committee to a better understanding of the situation.

"The Registration Scheme."—This does not seem to have met with much approval—which is understandable as it can be of no use to planters in Native States without "extradition." It is also an unwieldy scheme and not likely to be of much benefit to anyone. The Registration Scheme to be of any use would mean "legislation." You then raise 2 points—

(1.) Will Government legislate on the lines we want?

(2.) *No legislation can be of any use to planters in Native States, without "extradition."*

These are the 2 rocks the Labour Committee will be wrecked on. One can understand the apathy of many of the affiliated Associations to legislation which will not benefit those living in Native States.

The U. P. A. should concentrate its efforts on obtaining "extradition" for Native States (though I hear planters in British territory do not want to see this granted) it would bring us all into line, and some scheme might then be evolved to suit us all. Meanwhile let us take a leaf out of the Ceylon Labour Commissioner's book and advertise and appoint recruiters for each District. Each District might arrange for its own recruiters. We have talked for years let us now act.

T. H.

The following is extracted from the Kalani Valley Planters' Association :

LABOUR :—In the opinion of your Committee the labour difficulties experienced in this district are somewhat less pressing than in previous years, owing no doubt to the fact that large acreages of tea are gradually going out of bearing, under rubber, and also to the fact that the continuation of the good work done by the members of this Asssociation in recruiting labour from coast is now bearing fruit. It is, however, the opinion of your Committee that advances have gone up a great deal during the past year, and they cannot help but think this is due in a great measure to the effects of the Priprietors' Labour Federation, the good work of which is nullified by such few estates having joined same. As regards Coast Recruiting your Committee are of opinion that the limiting of A Forms to Rs.15 per head for coolies recruited has aimed a blow at the iniquitous practice of obtaining labour through unscrupulous recruiters.—*The Weekly Times of Ceylon.*

EXPLOSIVES AS AN AID TO AGRICULTURE.

(From a Correspondent.)

The method of clearing land by explosives, which is coming into vogue at home, is one of great interest to planters. It is claimed by those who advocate the adoption of it that the land may be cleared of stumps and scrub and that it my be tilled and drained.

There are several methods of removing stumps, but I will only give a brief outline of the one which appears to be most suitable to Indian plantations where it is desirable to remove the whole of the stumps and roots. A hole is made in the ground sloping downwards under the stump, and passing as close as possible to the tap root to a depth of about two thirds of the girth of the stump. The pellets of gunpowder should be pushed home into the hole singly, the last pellet being fitted with safety fuze. Cheddite or black gunpowder appears to be the best for this purpose, but in very damp ground Gelignite, which is unaffected by moisture, may be used. The charge can be roughly calculated by squaring the girth of the tree in feet and dividing by 1½ for lightly rooted trees, or doubling the same number for very firmly rooted ones.

The cost of removing stumps by this process must of course vary considerably, but at home the cost of the explosives for soft wood trees may be estimated as follows, the square of the girth of the tree in feet divided by 20 gives approximately the cost of explosion required in shillings -thus for a tree 7 ft. in girth $\frac{7 \times 7}{20}$ roughly 2*s*. 6*d*. For hard wood trees the cost might be as much as double.

With regard to tillage owing to the variety of soils it is difficult to lay down rules to govern the amount of explosives to be used. A few experiments however would soon determine the proper quantities and the depth to which the charge should be inserted, and the distance of one charge from the other.

The procedure for experimenting is as follows:—

Bore three holes of sufficient depth to get the charge not less than from three inches to two feet below the top of the sub-soil, the smaller depth being used for rocky sub-soils, and the larger for softer natures, the holes being set at intervals of four times as many feet apart as they are feet deep.

Charge the holes with the explosive according to the following scale:—

Depth of Hole.	Charge.	
2 feet ...	... 1½ oz.	Gelignite or Cheddite.
3 " ...	... 2 "	" "
3½ " ...	... 3 "	" "
4 " ...	... 4 "	" "
5 " ...	... 6 "	Holes of greater depth than 4 feet are exceptional, but may be found useful, especially in very wet ground.
6 " ...	... 8 "	
7 " ...	... 11 "	
8 " ...	... 16 "	

If Gunpowder is used double the quantity will be required.

Fill up the holes with loose earth scraped from the surface, the larger half of this earth being tamped or rammed firmly with the wooden rammer.

Fire these three holes, and correct the charges according to the instructions given above. It will afford useful information if the results of a shot are examined by digging down on it, before firing the neighbouring shot. After firing the next shot it can be seen by comparison with the previous condition whether the sub-soil is properly fissured, and the distance to which the action of the exlposive has spread is sufficient for the ground to be broken up completely with holes spaced according to rule.

This method provides for breaking up the sub-soil fairly completely. Where a mere loosening is required the holes can be spaced up to four times as widely as this.

The advantages claimed for this method are: –

(1.) The hard soil beneath the loam instead of presenting an impenetrale layer through which the rootlets only penetrate with extreme difficulty, and which provides but little nourishment, is broken up into numerous cracks and fissures, into which the rootlets penetrate with ease, and which being filled with humus and moisture sustain and nourish the growing plant in a way that is only to be seen to be appreciated.

(2.) The explosion itself generates large quantities of nitrogen, and drives it into the cracks of the sub-soil, where it is available for plant consumption, but is not so liable to be carried away by wind and rain as when applied close to the surface.

(3). In wet seasons the breaking up of the hard pan and subsoil improves the drainage, and tends to prevent the land getting into that sour and waterlogged condition so inimical to healthy growth.

(4.) The surface water instead of running quickly off the land sinks into the cracks in the sub-soil, and remains there as a reserve of moisture invaluable to the crop in unduly dry seasons.

(5.) Probable destruction of deleterious soil bacteria.

With regard to draining it is effected by making vertical fissures through which the water can sink into the earth.

The depth to which such holes should be bored and the charges fired must depend entirely upon local geological conditions. It will generally be advisable to " spring " a chamber at the bottom of the hole with a single cartridge unstemmed, so as to concentrate the charge as much as possible and to strike well into the permeable stratum. Charges of 5 lbs. of Gelignite at 8 feet, and 15 lbs. at 15 feet will be about what is required, or double these quantities of gunpowder.

This method of tilling the soil would probably be too costly for the large areas to which one is accustomed in India, and probably the stirring of the soil to such a depth as is done by means of explosives is for general purposes unnecessary, and possibly, when heavy rainfall prevails, undesirable. A friend who recently had an acre " tilled " with explosives and was more than satisfied at the result, assured me that it was infinitely cheaper than trenching by hand, and that when it was finished he could push a crowbar in anywhere 4 ft. deep. Trenching at home which labour at 3s. per day is an expensive operation, and the comparison would not be so favourable to the explosion method where the labour employed received only 4 as. per day.

Where small areas have to be cultivated, and depth is an important factor, such for instance as preparing land for a nursery I believe this method would be invaluable. Not only would the soil be opened up to a depth that it is difficult to reach with manual labour, but stumps, rocks &c., would effectually be removed.

The removal of stumps by explosives is no doubt costly. But when one considers the evil results of leaving them in the land it is a question whether it would not pay in the long run to eradicate them when the land is cleared, and whether the most efficient way of doing so would not be by means of explosives, especially if as is claimed deleterious soil bacteria are destroyed in the process.

The Planters' Chronicle.

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THE U. P. A. S. I.

(INCORPORATED.)

Contents.

We publish in continuation of the report by the Government Entomologist and it is hoped that a tour will be arranged for him at the time of coffee blossoming. Planters will be interested to know that the Berna or "Flying Ant" is of some use. As a rule one hastens to destroy these nests as a "nuisance, for many must have seen how they have caused fields to be deserted for days by their attacks. But evidently even a "nuisance" has its uses.

The Scientific Officer publishes an interesting article on "Tea Fluff" as a manure for roses. In olden days used tea leaves have been used for the same purpose, but until lately the use of the fluff had not been recognised. Tea Planters are to be congratulated on having what may be called an indigenous manure at hand. the effects of which so marvellously improve a rosary. As regard Brown Rot or Stump Rot it can best be dealt with by uprooting and burning it. It is drastic but efficacious.

The Labour question as it applies to the Registration Scheme, has drawn a letter from Mr. Marden in reply to one from Mr. Martin. The Editor does not hold himself responsible for any opinion held by his correspondents. He is willing and anxious to publish any letters on the subject, however, openly expressed, but deprecates personalities. A good cause is often marred by these.

A circular from the Indian Tea Association is printed and it is hoped that next season the suggestion will be carried out by all Tea Planters in Southern India.

Mr. Osborne's report in Coffee at Havre is concluded this week, and will we hope be of use as a reference in the future.

The half yearly Flower Show at the Lal Bagh will be held on the 1st and 2nd February and Mr. Anstead, Scientific Officer has been selected to judge Fruits and the Secretary has been asked to judge the Agricultural Implements.

BEES AND THE FERTILISATION OF COFFEE

[*Continued.*]

Report of the Government Entomologist on a tour in the Bababudin District of Mysore State.

"I left Coimbatore on the evening of 30th October and next morning reached Bangalore where I met Mr. G. N. Frattini, the Planting Expert's Assistant for Mysore, and we reached Kadur the same afternoon. Owing to difficulty in obtaining transport we started from Kadur early next morning and reached Chickmaglur the same afternoon. Next day (2nd November) we went on to the Bababudin Hills, where I stayed until 13th November, when I left for Chickmaglur and Kadur and arrived at Mysore on the afternoon of 14th November. Here again there were transport difficulties and it was not until noon on 15th that I was able to start for Sidapur which was finally reached at 3 a.m. next morning. From Sidapur I went to Fairlands Estate on 16th November, on 17th on to Margalli, and on 18th from Margalli to Mercara, where I halted for 3 days. From Mercara my intention was to visit Dunkeld Estate, where considerable damage to Cardamoms by a Scolytid beetle has been reported; but although the distance from Mercara was only some twenty miles, no means of transport were forthcoming and I was reluctantly compelled to abandon this visit. I left Mercara on 22nd November, stayed that night at Santikoppa, and proceeded on to Mysore next day, arriving back at Head Quarters on the morning of 25th November.

"The main object of this tour was to make a preliminary survey of the localities visited with a special view to collecting information regarding the occurrence of Honey-bees and other flower-frequenting insects, with regard to their influence on the pollination of coffee. Incidentally, of course, collections of economic and other insects were made and various interesting habits, etc., noted, but this report is not the place for such details. As the conditions are rather different, the Bababudin Hills and Coorg may be considered separately.

THE BABABUDIN HILLS.

"Three species of true Honey-Bee occur here :—

(i.) The large Rock Bee ((*Apis dorsata*).

(ii.) The Indian Bee (*Apis indica*).

(iii.) The small bee (*Apis florea*).

"The large Rock Bee builds regularly at a height of about 5,800 feet on the Eastern face of the Hills, recourse being had to one particular vertical cliff where there is a fair amount of shelter by overhanging rocks. This colony is not a large one, comprising perhaps thirty to forty combs on the average.

"Fairly definite evidence was obtainable that these bees desert their combs on the onset of the S. W. Monsoon (about June) and return again with the N. E. Monsoon (November-December); beyond the general opinion that they fly off in an easterly direction no information was obtainably regarding the locality in which they spend the intervening period. Possibly it is somewhere in the vicinity of Kadur. The swarms which return to the Hills at the end of the year seem to be small ones and perhaps the number of individuals on a comb is greatest at the end of the hot weather (April-May).

Neither honey nor wax appears to be collected systematically whilst the bees are in the Hills. The cliff on which they build is situated well above the limits of the Coffee Estates on this side of the Hills and the Bees, so far as I could ascertain, are not interfered with at all. The reason for their migration from the Hills in June is probably to be found in climatic causes the excessive rain in the Hills during the S. W. Monsoon hindering them from foraging for food.

"The Indian Bee occurs fairly commonly, building as a rule in hollow trees. It is noteworthy that in these Hills the local race of this Bee is much darker than in the Plains and this seems to be the case generally in the montane districts of Southern India. The nests are robbed when found and swarms are sometimes taken and kept in earthern pots although I only heard of one case of even this simple form of apiculture.

"The small Bee was not common at the time of my visit and I was only able to find one small colony. Possibly it migrates in the same way as the Rock Bee. This Bee is regarded as stingless by the local inhabitants and the nests are commonly robbed for the honey which is usually squeezed out and eaten on the spot.

"In addition to the true Honey-Bees, mention may be made of a large tawny-yellow Carpenter Bee (*Xylocopa rufescens*) which was found fairly commonly at flowers after dark. None were to be seen in the day-time but they began to appear in the evening after sunset and flew freely around flowers long after night had fallen. This habit on the part of a Bee was quite new to me but, on looking up the literature, I find that Colonel Bingham recorded its crepuscular flight (*Journal of the Bombay History Society*, Volume VIII, page 388); he also found the nest, which consisted of a series of round cells hollowed out in the end of a decaying log. This Bee does not seem to have been recorded from Southern India before, although its peculiar nocturnal habits and comparative abundance (in some localities in these Hills at least) may possess some importance so far as concerns the pollination of coffee.

"Special attention was paid to the insects frequenting flowers. Those found in the day time call for little comment, including the butterflies, bees, flies, etc, usually found. Towards sunset, however, quite a different fauna put in an appearance, the first arrival at the flowers being Hesperid (Skipper) Butterflies and Humming-Bird Hawk-moths (*Microblossum* spp.). As twilight set in, these gave way to numerous other Sphingids (*Hippotion boerhaviae. Deilephila Hypothous. Theretra nessus, Herse convolvuli, Nephele didyma*, etc.,) which flew actively from flower to flower accompanied by numerous smaller moths, especially various species of *Plusia* and others of slower flight. The number of flowers visited in an evening by one of those larger Hawk-moths must be very large and it is notable that flowers with very deep nectaries are probably adapted for pollination by means of some of these moths whose tongues in some species (e.g *H. convolvuli*) are much longer than their whole bodies. I expect we shall find, when experiments are made in the coffee-flowering season, that crepuscular and nocturnal insects such as these play a large part in the fertilisation of the blossom, and it may then be considered whether they cannot be encouraged by the planting of attractive bushes such as Madras Thorn (*Duranta*).

"Nests of a small wasp, called locally "Berna" or "Flying Ant" are common in this district being hung from trees. Though often burnt out as a nuisance, these wasps are probably beneficial by feeding on caterpillars, etc., and rarely attack unless disturbed.

" Amongst other insects noticed were:—

Plutell maculipennis, abundant on cabbages;

Athlia proxima, larvae on turnip leaves;

Xylotreohns quadripes, (Coffee Borer); and

Dacus cucurbitae (Fruit Fly) on Marrows.

Note.

With regard to the comb foundation for *Apis indica* kept in artificial hives, mentioned in the Government Entomologist's tour report on the Shevaroys, he now writes that the Ceylon Agricultural Society will supply this comb foundation at Rs.3 per pound. At present, however, they have great difficulty in getting suitable wax, and they would be prepared to stamp out *Apis indica* foundation in their machine at a nominal charge of Re.1 per pound if wax is supplied. This information will be of interest to would-be bee-keepers in Southern India.

Since the above report on the Government Entomologist's visit to the Bababudins was written I have found the bee *Xylocopa rufescens* in Bangalore. It regularly appears at dusk in my garden and visits Sunflowers and Hollyhocks which are in flower in profusion in the borders just now.

R. D. A.

CONDITIONS SUITABLE FOR SISAL HEMP CULTIVATION.

An article in the *Tropical Agriculturist* for September 1912 states that the International Fibre Congress and Exhibition, held at Soerabaya, Java, in 1911, came to the following conclusions regarding the conditions that are best suited for the growing of sisal. The experience is obtained from the cultivation of Agave (chiefly *A cantala*) in Java, where this is the most important fibre plant. It is quite different from the sisal (henequen) of Mexico, which is *A sisalana*:—

"The culture of sisal hemp is not remunerative on lands which do not permit cheep transport of the raw material, nor on poor land nor in a cool region where the yield falls below 650 lb. of fibre per acre. It can be grown with advantage on soil deficient in humus, where cacao and coffee no longer 1,200 feet above sea-level. It is most profitable grown as a secondary product, since it can then be left untouched when the market price is low, or during seasons when the production of leaf is small. It cannot be recommended as a catch crop or intercrop. If sisal is the chief product, estates of less than 700 acres are not profitable. For an estate of 900 acres the cost of upkeep and replanting, upkeep of buildings, managements, etc., together with 5 per cent interest on the capital, will be about 54 rupees per acre. The capital required is estimated at 535,000 rupees. The expenses of harvesting, transport, commission, etc., and depreciation are reckoned at about 100 rupees per ton of fibre, while the value per ton of dry fibre, f. o. b. Java, is about 300 rupees. The net profit, with a production of 650 lb. per acre is not more than 5 per cent., but with a production of 1,300 lb. per acre it increases to 20 per cent."—*The Agricultural News*,

THE SCIENTIFIC DEPARTMENT, U.P.A.S.I.

Tea Fluff as a Manure for Roses.—At the Annual Meeting of the U. P. A. S. I. during 1912, Mr. J. S. Nicolls mentioned that he had discovered that tea refuse was an excellent manure for Roses and that it had a marvellous effect upon them. The Chairman, Mr. C. E Abbott, repeated the experiment with a similar result and when sending me a sample for trial and analysis he wrote, "the result is extraordinary giving flowers six inches across and greatly improving the colour. We applied a double handful to a standard and more to big bushes" Good results have also been obtained with this fertiliser in Bangalore though it was not applied at the most favourable time of the year. Its effect, however, is undoubted.

This material is the yellow fluff which flies about the factories when the tea is sifted. In the first column of the table below is an analysis of it which has been made by the Scientific Officer, and in the second column are figures published in the Indian Tea Association Scientific Department's Quarterly Journal IV of 1911. It will be seen that these figures agree closely, but the South Indian samples oontain more moisture and considerably less lime.

	1	2
Moisture	10·31	87·48
*Organic Matter	81·37	
Silica	3·16	5·40
Phosphoric acid	0·53	0·63
Potash	1·61	2·02
Lime	0·44	1·44
Oxide of Iron...	0·45	...
Other Mineral Matter	2·13	...
	100·00	...
*Containing Nitrogen	3·24	3·52
Total Ash	8·32	12·52

It will be noted that there is nothing very remarkable about this material as a fertiliser to be gathered from its analysis, and in the Ceylon Journal mentioned above its value is said to be "somewhat less than an equal weight of mustard cake." It is, however, a complete fertiliser and being finely divided it probably quickly rots down and becomes available.

Phosphatic fertilisers like Bone Meal and Basic Slag are usually considered good for Roses. While dealing with the subject it may be of interest to mention that the *Gardeners' Chronicle* of 28 December contained an article calling attention to the fact that despite the fact that Magnesia is harmful to plants, especially when in excess of lime in the soil, numerous experiments have shown that it is a beneficial fertiliser for Roses. The Ash of the Rose plants contains a large amount of Magnesia. Wolff found it distributed in the following proportions: roots, 7·15; wood, 7·62; leaves, 9·23; flowers, 5·94. It is advised to apply Magnesia to Roses in the form of sulphate in doses of about five ounces per square yard, and kainit is also a useful form of magnesia to use.

Brown Root Disease (Hymenochaete noxia.)—Dr. Butler, the Imperial Mycologist stationed at Pusa, has very kindly sent a copy of a report he has recently made on this disease for the Imperial Forest Botanist at Dehra Dun. The plant attacked in this case was Hevea Rubber. Dr. Butler says in his report:—

"This disease is common in the Eastern Tropics on a large number of economic plants including rubber, tea, coffee, cacao, camphor, bread fruit, etc. It appears to be seldom found in the perfect fruiting stage of the parasite and most of the cases seem to have been determined in the sterile condition. Even in this state it is characteristic, owing to the brown or black incrustation on the main roots in which are embedded earth, small stones, and plant debris, the whole having a brittle, charcoal-like consistency. Examined under the microscope tawny brown hyphae of a Basidiomycete can be found, often in considerable masses. At first they give a brown colour to the mass, but later on the surface forms a black and rather shiny brittle crust.

"Even when spores cannot be found a characteristic structure may be detected at the surface of the crust. This is the presence of numerous stout rigid bristles which project from the surface, giving it a velvety appearance.

"I have collected typical cases in Assam on tea and have received others through the Scientific Department of the Indian Tea Association. So far as I know, the perfect (sporiferous) stage has not yet been found in India but the fungus appears to be widely present in Indian soils.

"Little is known of the life history. In some cases at least it appears to begin (like several allied diseases) from old decaying stumps of jungle trees. It is stated that spread can only take place along the roots, not through the soil, and that progress from tree to tree is very slow. Spread by spores is not likely to be common.

"The treatment recommended by Ceylon and Straits writers is to remove the diseased trees, with as much of the root system as possible, and also any old stumps found in the immediate neighbourhood, at the same time examining the roots of neighbouring trees, where they approach the diseased one, and cutting out all that show signs of rot. This is said to be sufficient, if thoroughly done, but some recommend the addition of quicklime. The soil should be well turned over at intervals. Replanting can be done early."

This is the fungus which produces the well known 'Stump Rot' in Coffee, Tea, and Rubber, in Southern India and causes a tree to suddenly die with all the leaves and perhaps fruit still hanging to it. A great deal of information about this disease will be found in the pages of the *Chronicle.*

Fish Manure.—Two samples of whole Fish from the West Coast have recently been examined in the laboratory. These contained 4·58 and 4·82 per cent. of Nitrogen and 27·98 and 31·65 per cent. of sand respectively. The percentage of sand is very high indeed and very much diminishes their value, lowering the Nitrogen content and adding considerably to the cost of transport, since some Rs.15 a ton is being paid for carting sand. This is emphasised by the fact that a sample of a mixture of Fish and Neem Poonac delivered in another district contained 24·14 per cent. of sand. Planters should insist upon Fish Manure containing only 2 or 3 per cent, of sand at the most,

R. D. A,

CORRESPONDENCE.

Labour Question.

Dear Sir.—With reference to Mr. Martin's letter to Mr. Hughes *re* Registration which was read in the Extraordinary General Meeting held by the Kanan Devan Planters' Association on the 23rd ultimo it appears to me that Mr. Martin has rather not been given much information in the proposed Registration Scheme or has not taken the trouble to try to understand it. I will take extracts from Mr. Martin's letter to criticise, (1) "I consider the Scheme unworkable." In the first place he states that he considers the scheme unworkable but wisely refrains from committing himself as to whether the unworkability lies in the scheme itself or with the planters, or for any other reasons. Equally large Finger Print Bureaux as the proposed one are being worked in Europe with great success and there seems no reason why one should not be worked here.

(2.) "No Scheme can stop Emigration." This scheme is not advanced with the idea of stopping emigration except as regards those who should not be allowed to do so on account of their indebtedness in this country. It is, I believe, an accepted fact that the planting community are at present suffering from considerable losses caused by coolies and maistries absconding, not only by emigrating, but by going from estate to estate and from District to District and that the practice is becoming more and more common and it is to hamper this that the registration scheme has been suggested, as it has been found impossible for the Police to catch the majority of the offenders. It is true, as Mr. Martin says, that there is nothing to prevent emigrants from travelling 1st class; but if the scheme is to apply to emigrants at all we shall have a law which will cause considerable inconvenience to cooly recruiters if they smuggle out of this country coolies who have no pass from the Registration Office, and it will be easier for the cooly recruiters to take finger prints and get a pass than to have the trouble of evading the law and running considerable risks by doing so. We do not want to stop emigration but we do want to stop emigrants from going off with our money and causing us loss by not carrying out contracts.

(3.) "The Scheme might enable a Registerer to catch persons whose finger prints are registered—true, but having caught them what can be done with them." I am glad Mr. Martin realizes that Registration may be able to catch delinquents—for this is all it is meant to do. After that the law deals with them. Now-a-days the difficulty is to catch your cooly even the first time he absconds. With registration he would be caught every time he tried to get advance on a registering estate, and it is possible that Government might realize the present scale of punishments are not sufficiently deterrent, or that the delinquents might prefer to complete their contracts. Those bent on "bilking" their employers would avoid registering estates so the police would have an easier job in searching estates which did not register. Also it would be simple for coolies to take advances from non-registering estates, and then go to a registering one where they knew there would be nothing against them.

(4.) "Are we to return to the days of slavery and the lash?" Comparing the taking of finger prints to slavery is absurd, and it is difficult to see where "the lash' comes in as even mild whipping has been abolished for breach of civil law. What possible objection can a professedly honest person have to giving his finger prints. Perhaps it would be best to regard this sentence as a mild attempt of (pointless) rhetoric.

(5.) "The coolies have only to go to the nearest Magistrate and say they do not wish to work with Mr. Registerer and claim the protection of the Court." If anyone can make contracts and evade their liabilities in this way why work ? Would Mr. Mártin kindly quote us any law confirming this line of action ?

(6.) " How many planters..............are going to take the trouble of returning paid off coolies imprints ?" This remark shows how carelessly Mr. Martin must have studied the scheme; as it was never suggested that any imprints should ever be retained by a registerer. At the end of a year the registration number of any finger print would automatically be cancelled, unless a renewal fee were paid.

(7.) " Who is going to pay the cost of feeding coolies while experts make up their minds how many of the gang are and how many are not registered ?" I fancy Recruiters would not take long to realize that it would be as well not to advance coolies or feed them before they obtained a clear pass from the Registration Office. The time it would take to trace any finger print is only a matter of a few minutes and is not a matter of " making up any one's mind."

(8.) " What is to prevent my goicg to Thondi and shipping from there " If the scheme is to be worked Government will only have certain ports licensed for the emigration of indentured coolies and recruiters would if they shipped coolies from elsewhere lay themselves open to punishment.

(9.) " Can Government justly refuse the same rights to Indian planters of rice and other products." This sentence is a little ambiguous but I presume Mr. Martin means by " rights" the right to prevent persons under contract from absconding if the delinquents can be prevented. The " planters of rice and other products" could do what we propose doing, *i,e.*, have a registration scheme of their own, if worth their while. The Registration Scheme is only to help the police to enforce the law.

(10.) " The Scheme is inadvisable being in the nature of class legislation." I am no lawyer so should be glad to learn how the legislation, we ask for, which is only to license certain ports for emigration, can be called " class legislation," any more than factory, emigration, and many other Acts made in the public interests. Government, we presume, is not anxious to encourage people to avoid their liabilities, and the proposed scheme is, as I said before, only to help the police to enforce the law, and could be applied to any business, *e.g.*, servants, clerks and employers of any kind. I can quite understand that the scheme is distasteful to all cooly recruiters whose interest ceases when the labour is delivered.

The rest of the letter is again off the rails of argument. I should have thought that Mr. Martin's long experience would have taught him that coolies can make much more by absconding from time to time than by working steadily for any pay planters can offer. As pay rises, so do advances, and the regular absconder makes the pay (whatever that may be) plus his advance. If planters gave a bonus on fulfilled contracts it mtght stop a certain amount of absconding, but it would have to be a high bonus, and would start a fresh line of competition among themselves which is what we want to avoid. No Government will make registration compulsory nor can they force planters to give advances if they say they will not do so unless a cooly registers. If Government refuse to license only certain ports for emigration, registration, if generally adopted, will stop absconding from estate to estate and district to district.

Ill-considered flippant letters such as those I have seen written by Mr. Martin from time to time do much harm amongst those who have not the time or necessary information to disect them.

(Signed) O. W. MARDEN.

January 23, 1913.

THE INDIAN TEA ASSOCIATION.

Royal Exchange Building,
Calcutta, 19th December 1912.

Circular No. 39.

Marking of Tea Chests.

Dear Sirs,

The subjoined copy of a circular of 8th November which has been issued by the India Tea Association (London) to its members inviting attention to the desirability of having tea chests from India prominently marked " Pure Indian Tea " is circulated for information. The Committee understand that the suggestion is being adopted by several firms and that they have issued instructions that tea chests from gardens under their agency should be so marked in future. It seems to the Committee that the proposal is an excellent one, for the reasons stated in the London Association's circular; they desire to recommend it to the careful consideration of all members, and to express the hope that it will be generally adopted.

D. K. CUNNISON,
Assistant Secretary.

DATED LONDON, E.C., THE 8TH NOVEMBER, 1912.

From—The Secretary, Indian Tea Association (London).

To—All Members of the Association.

A practical and inexpensive method of drawing attention to *Indian Teas*, at present little known outside big centres in comparison with the products of Ceylon and China has been suggested, and it is possible only by the goodwill and co-operation of Boards, Agency Houses and Proprietors. This is by stencilling the words *Pure Indian Tea* prominently on all chests leaving the factory. The words " Pure Indian Tea " are suggested, as the purity of Indian Tea has always been a feature of its advertisement wherever made under the auspices of the Tea Cess.

Tea chests after sale, especially Venesta's, are extensively used for packing other commodities, and circulated all over the country, often going abroad, while original chests of Indian Tea find their way into the Provinces and may be seen in grocers' shops; but, beyond the garden mark, grade of tea, and weight, bear no indication of the country of origin, whereas similar chests from Ceylon almost invariably bear prominently the words " Ceylon Tea."

The Committee venture to ask for your co-operation by the issue of the necessary orders to secure that the above words be stencilled prominently on all chests despatched from the commencement of next season.

In the Book of Proceedings of the last Annual Meeting it will be remembered that a very interesting speech was published by the Hon'ble Mr. Jackson, and was listened to with great attention, on the subject of the Tea Cess and its renewal. The figures he gave were conclusive, and the advice, he gave to take advantage of the prosperous time has borne fruit and the Tea planters are to be congratulated that the Tea Cess is to be renewed for a further five years.

COFFEE.

Coffee at Havre.

(Continued.)

The total imports of raw coffee into France for consumption in the calendar year 1911 amounted to 244,823,031 pounds valued at $24,219,184 ! about one-half was Brazilian coffee. The follwing table shows the quantities, by countries of origin, imported in the calendar years 1909, 1910 and 1911.

Countries.		Pounds. 1909.	1910.	1911.
Netherlands	...	196,870	147,267	195,548
England	...	277,559	194,225	139,110
British India	...	12,465,910	12,362,735	13.977,384
Venezuela	...	10,829,215	13,312,918	21,642,558
Brazil	...	140,911,859	146,155,720	126,038,525
Hayti	...	38,141,564	35,851,646	40.882,543
Porto Rico	...	3,508,179	2,432,555	2,578,059
Guadeloupe	...	1,917,561	1.668,220	1,902,349
Reunion	...	293,432	314,375	263,890
Other countries	...	29,426,780	34,095,461	37,203,065
Total quantity	...	237,968.929	246,535,122	244,823,031
Total value	...	$21,666,180	$24,388,445	$24,219,184

AVERAGE PRICES.

The following table, compiled from reliable sources, shows the highest, lowest and average prices per pound of coffee in commercial transactions at Havre for the periods or crop years specified from 1850 up to the present time:—

10 and 5 years periods:—		Lowest,	Cents. Highest.	Average.
1851-1860	...	7·0	12·8	9·1
1861-1870	...	8·4	15·0	12·9
1871-1880	...	9·1	25·9	16·3
1831-1890	...	7·1	21·5	12·2
1891-1895	...	13·8	23·1	17·0
1896-1900	...	5·4	16·8	9·1
1901-1905	...	5·1	9·8	6·9
1906-1910	...	6·0	8·6	7·6
Seasons:—				
1900-1901	...	6·1	9·8	7·4
1901-1902	...	5·7	8·5	6·6
1902-1903	...	5·2	6·8	5·9
1903-1904	...	5·1	8·7	6·7
1904-1905	...	7·0	8·8	7·8
1905-1906	...	7·6	8·6	8·2
1906-1907	...	6·0	8·6	7·2
1907-1908	...	6·1	7·8	7·2
1908-1909	...	6·4	8·0	7·3
1909-1910	...	7·0	8·5	7·8
1910-1911	...	8·0	12·9	10·8
1911-1912	...	11·9	15·7	14·0

A competent authority in this city, when asked to explain the extreme fluctuations in the above table, attributed them wholly to natural causes and the normal operation of the law of supply and demand. "The rise in the average price at Havre," said he, "from 9·1 cents a pound in 1850 to an average of 12·9 in the period 1861-1870, 16·3 cents in 1871-1880, and to 17 cents. in 1891-1895 was due to an increase in consumption as well as to unfavourable reports concerning future crops. The fall in price to 5·9 cents a pound in 1902-3 was due to an excess of production. The present average price (15·4 cents on October 17) is due to bad crops and unfavourable reports respecting the future. The same authority states that the recent shipments of valorised coffee from Havre to the United States represented coffee repurchased by the Brazilian Government "in order to safe-guard the interests of the planters."

The current retail price for a good grade of Porto Rican coffee is 37·7 cents. per pound. For purposes of comparison it may be stated that the retail prices per pound for other coffees are now as follows, in cents. St. Marc, 32·2; Malabar, 35; Santos, 31·3; Rio, 31·3; Gonaives, 31·3; Mocha, 36·8; Java, 36·8; Bourbon, 37·7. Porto Rican coffee is highly regarded in France and is frequently blended with Mocha in equal proportions.

THE WORLD'S CONSUMPTION OF COFFEE.

E. Laneuville, of Havre, has recently compiled statistics of the world's consumption of coffee, showing the per capita consumption of each country. The following table is based on these statistics, reduced to American equivalents:—

Countries.	Total consumption. bags. 1901.	1910.	1911.	Per capita consumption 1911. lbs.
United States ...	6,215,000	7,085,000	6,885,000	9·92
Germany ...	2.690,000	3,020,900	2,985.000	6·39
France ...	1,350,000	1,790,000	1,775,000	6·17
Austria-Hungary ...	705,000	920,000	895,000	2·42
South Africa, Argentine and Brazil ...	380,000	860,000	835,000	...
Netherlands ...	625,000	700,000	700,000	16·31
Belgium ...	510,000	625,000	600,000	10·58
Sweden ...	460,000	585,000	575,000	13·23
Italy ...	255,000	405,000	425,000	1·65
Russia ...	325,000	410,000	405,000	·44
Denmark ..	155.000	235,000	245,000	11·35
Norway ...	190,000	225,000	225,000	11-46
Turkey, (all) ...	170.000	230,000	225.000	2·20
Spain ...	145.000	225,000	215,000	1·43
Great Britain ...	240,000	215,000	210,000	·66
Switzerland ...	145,000	180,000	170,000	6·83
Algeria ...	90,000	125,000	125,000	3·19
Greece, Roumania, Servia, Bulgaria ...	90,000	125,000	115,000	1·10
Egypt and N. Africa ...	60,000	95,000	105,000	·77
Portugal ...	45,000	55,000	60,000	1·43
Total ...	14,845,000	18,110,000	17,775,000	...

It appears from the above table that the six countries consuming the largest quantity of coffee in the calendar year 1911 were the United States, Germany, France, Austria-Hungary, the Netherlands and Belgium. The six countries which showed the highest per capita consumption were, in the order mentioned, the Netherlands, Sweden, Norway, Denmark, Belgium and the United States.—*The Spice Mill*,

RUBBER.

Natural and Synthetic Rubber.

Under the above title an interesting address was delivered by Dr. F. Mollwo Perkin before the Society of Arts on December 11. After briefly reviewing the history of the development of the india-rubber industry and the nature of the processes used in extracting the natural product and in vulcanisation, an account was given of the recent synthetic processes by which the manufacture of artificial rubber on the large scale has become a commercial possibility. In the process of the Synthetic Products Co., isoprene is made from fusel oil, which is fractionated so as to give *isoamyl* alcohol, $CH\ (CH_3)_2.\ CH_2.\ CH_2.\ OH$, which is converted into the chloride, $CH\ (CH_3)_2.\ CH_2.\ CH_2.\ Cl$ by the action of hydrochloric acid and then into the dichloride $C\ (CH_3)_2\ Cl.\ CH_2.\ CH_2\ Cl$ by the action of chlorine, under specially controlled conditions; the dichloride obtained is passed through a tube heated at 470° and filled with soda-lime whereby it is converted into isoprene, which can be polymerised to rubber by means of small quantities of sodium.

The only difficulty in the way of this process is the cost of the raw product, amyl alcohol, which is about 1,402 per ton. On this account, Prof. W. H. Perkin, with E. H. Strange, F. E. Matthews, and Prof. Fernbach, devised a process for obtaining butyl alcohol cheaply, from which butadiene could be obtained. By the employment of a certain organism, it was found possible to ferment starch, and, more recently, sawdust, so as to obtain butyl alcohol and acetone, the latter being sold, thus cheapening the cost of the butyl alcohol. The butyl alcohol is chlorinated in the same way as the *isoamyl* alcohol, and by similar treatment with soda-lime yields butaniene, $CH_2 : CH.\ CH : CH_2$ which on polymerisation gives a rubber which, although not chemically identical with the polymerised isoprene, has all the properties of natural rubber in regard to elasticity and behaviour towards sulphur on vulcanisation.

An account was also given in the lecture of the processes devised by the firm of Friedrich Bayer, of Elberfeld, and of the interesting fact discovered by Prof. Harries that the presence of a small quantity of rubber ozonide very much increases the rapidity of polymerisation of isoprene and its derivatives.

In discussing the question of the competition of natural and synthetic rubber, it is pointed out that "at present prices and with the present supply and demand there is no reason, provided synthetic rubber is as good as natural rubber, why the two should not exist side by side." But the rubber planter is bidden to take heed of the lesson taught by the fate of the natural alizarin and indigo industries and consider possibilities of improving the yield of natural rubber by better methods of tapping, coagulation, the study of agricultural conditions, and possible improvements by fertilisation and the suppression of insect pests, which play havoc with the young trees. It is a significant fact that the Badische Anilin and Soda-Fabrik has agreed to put by £1,000,000 for research in connection with synthetic rubber, just as nearly £1,000,000 was expended by the same firm in research before synthetic indigo was placed on the market.—*Nature.*

The above is interesting reading but it is as well to remember that Dr. Lothar E. Weber, Ph. D. has said in the *India Rubber World*: "I do not want to make such a rash statement as to assert that synthetic rubber will never be a commercial possibility, but I should be greatly surprised if there is anybody engaged in the rubber industry to-day who will have the opportunity of seeing synthetic rubber in open competition with the natural product."

The Planters' Chronicle.

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THE U. P. A. S. I.

(INCORPORATED.)

Contents.

The report of the Government Entomologist is continued and deals with Coorg. As the importance of bees is recognized for fertilising purposes, it remains with planters themselves to prohibit the destruction of combs within the limits of their estates.

The Scientific Officer writes on Scale Insects and advises spraying as the cure. He concludes his article with an anecdote full of meaning to those who can appreciate its significance.

The Proceedings of the Wynaad Planters' Association are printed. In the Annual Report the question of Labour and Emigration is dealt with which shows how difficult a problem the Labour Committee has to solve.

The use of explosives in all agricultural pursuits is looming large and occupying the attention of practical farmers all the world over and we hope that the Planting Community of Southern India will give the suggestion a trial and publish in our columns the cost of such experiment, for the benefit of the industry at large. It is the difference of cost between explosive and manual labour we are anxious to arrive at. The results we have no doubt about.

We have been asked to publish the following which we have much pleasure in doing:—" In the course of demolition of the last of the old buildings of the Lalimli Mills, this week, to make room for another modern Mill, workers came across a toad securely imbedded in the mud wall, and alive. As the building was erected 30 years ago, there can be no question that the toad has existed in the small pocket formed by its body for that period without air or food. It is now contentedly reposing in a sealed bottle buried in the earth and is the object of much curiosity."

Several well known planters have been passing through Bangalore. Mr. St. John Hunt who was on his way from home was taken seriously ill but is now convalescent.

Mr. and Mrs. F. M. Hamilton are passing through on their way to England and we wish them *bon voyage*.

Mr. Murray Aynsley is staying for a short time in Bangalore and his friends will be glad to know that he is in the best of health.

BEES AND THE FERTILISATION OF COFFEE.

[*Continued.*]

Report of the Government Entomologist on a tour in Coorg.

"My visit to Coorg was brief and hurried and gave little opportunity for detailed investigations. The three species of Honey-Bee mentioned above occur. ***Apis dorsata*** (The Rock Bee) in this district seems to build on trees rather than on rocks, returning year after year to the same tree, or group of trees, upwards of a hundred combs being sometimes suspended from the branches of a single tree. I saw such a favourite tree on Fairlands Estate, although at the time of my visit it did not contain more than about 30-40 combs, and these all unoccupied, showing that migration is also the rule in this locality. From inquiries it appears that at the present time there are fewer of these "Bee Trees" than there used to be, and that the number of the combs in each tree has also decreased. It is possible that this is directly due to the development of the Coffee Estates which do not favour the growth or preservation of trees suitable for these Bees to build on. The combs are occasionally robbed, the trees being climbed at night and the combs cut with a knife under the protection of a torch and a *kumbli.* There appears, however, to be no organised system of destruction of these combs and, where these are situated within estate limits. it is within the power of the Planters to put a stop to such practices. There is a large colony of *A, dorasta* underneath the arches of the Sidapur Bridge and, when these combs are robbed, the bees are said to make the road practically impassable for traffic.

"The Indian Bee (*Apis indica*) builds in suitable hollow trees scattered throughout the wooded areas. The nests are robbed when found, but are not hunted for systematically.

"The Small Bee (*Apis florea*) builds in bushes, etc., almost everywhere. The nests are robbed when found, the honey being usually squeezed out and eaten on the spot. It would be impossible to protect this Bee, but Planters might do something to protect the nests of *Apis indica* on their own estates, as the taking of a nest usually leaves tell-tale evidence of chopped trees, etc.

"At Santikoppa I saw some of the mysterious holes in the ground of which so much has been heard and written. These apparently appeared about two years ago and are still visible in many places when the surface soil is removed. They consist of holes of such a size as to accommodate one's little finger and lead down into the ground for two or three feet, when they terminate abruptly. Often they are situated close alongside and paralled with the main stem of a Coffee-bush, and a half a-dozen or more are often crowded together within as many square inches. No probable author of these holes could be discovered in them when they were first noted, although they have been ascribed to Cockchafers which are common in the District. I am inclined to connect them with a species of Cicada, more especially as an unusual abundance of a Cicada seems to have synchronised with the appearance of the holes, whose general characters seem to correspond closely with the descriptions given of the seventeen-year Cicada in America. Possibly we have in Southern India one or more species whose habits and lengthy life-cycle are parallel to those of the better known American insect. (See also the *Planters' Chronicle*, 14th December 1912, page 683). The whole matter is certainly quite interesting from both the entomological and planting view points. It may be added that, although cockchafers are commonly accused of doing great harm in certain places to Coffee-bushes (particularly young ones in nurseries, etc.) and although they certainly may do such harm when present in large numbers, yet they are probably not the only culprits in this case. We see that there is at least a possibility of the discovery of a long-cycle *Cicada* whose larvæ would live in the ground for any period up to, or even exceeding, twenty years, sucking the sap of young roots all that time. And even during my hurried visit I was able to collect several species of Tripulid Flies whose larvae are well-known as being root-feeders. The whole question of root-feeding insects of this sort demands prolonged and careful investigation on the spot by an Entomologist.

"My main object in going to Mercara was to visit Dunkeld Estate where serious injury had been reported as done to Cardamom fruits by a boring Scolytid beetle, but it proved impossible to proceed beyond Mercara owing to transport difficulties. However, I was able to see some Cardamoms at Mercara and found the same beetle in small numbers, the owner of the Estate affected estimating that about ten per cent. of his crop was spoilt in this way. No measures of control have been taken and without further local investigation it is difficult to suggest much beyond collection and destruction of all attacked fruit,

"Lantana grows freely on the hills around Mercara and attempts are being made to cut and burn it over certaln areas and to keep such areas free of regrowth. In this connection it was interesting to note that Lantana here was freely attacked by a small Plume-moth (*Platyptilia pusillidactyla*) whose larva bores into and practically destroys the young seed-head, so that an attacked seed-head bears only three or four weakly-looking fruits whereas a normal unattacked head may bear fifteen or sixteen plump healthy fruits. A few caterpillars cut the leaves but such do practically nothing to check the growth of a plant like Lantana, whereas this little moth checks its spread directly by limiting its power of dispersal by seeds eaten and carried by Vertebrates."

The following note on Bees in Coorg appeared in the *Agricultural Journal of India* in 1908:—

There are two kinds of honey bees in Coorg, the large and the small. The former are not domesticated. Their nests are found on high trees, preferably *Lagerstroemia microcarpa*, and the wild mango tree, under the arches of bridges and public buildings and precipitous rocks. There is a hill in Coorg called Jain Kal Betta (Honey Rock Hill) where these bees have been settled from time immemorial. Their honey has an acid taste and is not much valued, but the wax is much sought after. It is a very difficult task to get at the hives, owing to the inaccessible positton in which they are found. In Coorg, the Jain Kurubas, a jungle tribe, are adepts at taking the honey.

The small bees are domesticated not by the Kurubas, but by ordinary ryots. A large earthen pot is smeared inside with bees' wax scented by rubbing the leaves of the wild cinnamon tree on the wax. About a dozen small holes, ½" in diameter, are bored into the pot, and bees' wax scented by the wild cinnamon leaves is rubbed round the holes on the outside. The mouth of the pot is closed by tying a cloth over it, and it is then placed upside down in the jungle, in a shady place. In time the pot will usually be found to be inhabited by bees. The pot is then very cautiously removed at night and placed in a dry place, free from ants, facing the east under shade. Some people have a hundred or more pots in their farm-yard. The bees are not disturbed by the people of the household. No attention, whatsoever, is paid to them till about June when the honey is removed. As a rule, all the honey is taken, but some careful bee-keepers leave at least one comb in each pot,

THE SCIENTIFIC DEPARTMENT, U.P.A.S.I.

Scale Insects.—Two specimens of Scale Insects have been received recently for indentification. The first proved to be *Lecanium hemisphaericum*, which is usually known locally as "Brown Bug." This scale was found on Coffee in a nursery. It is a common scale on Coffee in all the planting districts and at times does considerable damage. It is not usual to find it in a nursery and it probably got there from some tree or plant near by, which should be hunted up and destroyed.

This scale varies from a pale brown to a deep chestnut in colour and is hemispherical in shape as its name implies. In the younger forms there is a crest running along the middle of the back with two side ridges on each side. The surface of the scale is smooth and polished. When full grown each scale becomes a mere shell filled with innumerable pale pink eggs, while at this stage the inner marginal surface is covered with a white mealy powder and, when a scale is detached from the plant, it leaves an oval white ring marking its former position.

It is a very common scale indeed and Green says of it, "habitat on leaves, twigs, and branches of coffee, cinchona, tea, and innumerable other plants, amongst which may be mentioned *Adiantum* and other ferns, asparagus, gardenia, gauva, *Coboea*, *Anthurium*, *Loranthus*, bamboo. In fact, the species may be considered as omnivorous as it is cosmopolitan. It has been recorded from almost every country in which Coccidae have been collected in both hemispheres."

Luckily it has many natural enemies in the nature of minute hymenopterous parasites and these tend to keep it in check. When a bad attack occurs, however, it should be sprayed with Vermisapon. or Kerosine-soap-rosin mixture. In the case of a nursery spraying operations are very simple and easy.

The second scale was on a species of *Anona* and proved to be *Ceroplastes actiniformis*. This is not a very common scale and it is easily dealt with. Under a lens it is a very beautiful object being of a delicate pink colour, the central area domed, and sides composed of a series of eight shield-like plates each with a depressed centre and separated by marginal indentations. It is easily killed by the usual sprays.

Use of Fertilisers.—The following from *The Gardener's Chronicle* is not without point:—

"An interesting example of the need for a proper comprehension of the mode of action of artificial manures is supplied in an anecdote related in Part VII of *A Pilgrimage of British Farming*. The writer of this interesting series of articles, now appearing in *The Times*, gives an account of a farmer who, as a concession to new ideas, determined to apply 10 cwt., to the acre of superphosphate to one of his fields. This he did, with excellent results. Thus encouraged, he increased the application to 16 cwt. in the following year on the same field, and, not unnaturally, got little or no crop. He then reverted to the use of dung, and obtained a magnificent return, because, with the nitrogen of the dung, the hitherto unused phosphate came into action. The conclusion which the farmer drew was that superphosphate and such like manures were foolishness, and that dung alone was good. The anecdote illustrates the need for the constant reiteration of the fact that the mineral needs of plants are various, and that it is not possible to satisfy a plant hungry for nitrogen with an excess of phosphates or something else. The wise gardener makes use of both dung and artificials."

R. D. A.

DISTRICT PLANTERS' ASSOCIATIONS.

Wynaad Planters' Association.

Proceedings of the Annual General Meeting held at Meppadi Club on January 22nd, 1913.

PRESENT.—Messrs. Bownass, Egan, Gillatt, G. R. C. Parker, Powell, Stewart, C. E. Abbott, (Honorary Secretary.) *Visitor:* Mr. G. R. Briggs, Mr. Egan in the Chair.

1815. *The Proceedings of the last Meeting* were confirmed.

1816 *Perrendotty P. O.*—Read letter from Honorary Secretary, and reply from the Postmaster-General, Madras. It has been laid down by the Director-General of Posts and Telegraphs (Order No. 216, dated Simla, May 19th, 1910) that in all cases where experimental offices are opened at the request of private individuals, the persons interested shall be required to make a non-returnable contribution towards the total expenses representing the establishment charges of the office, and of the separate line, if any, opened for their benefit. Recorded.

1817. *Meppadi Church.*—Read letter from Rev. H. Jones, Chaplain of Calicut thanking the Association for voting a sum of money for the repairs of this church.

1818. *Chenal Mulla Bridge.*—Read correspondence ending with a letter from the Assistant Engineer dated January 5th, 1913, stating that funds had been provided for this bridge, and that the work would be started shortly. Recorded with satisfaction.

1819. *Election of Honorary Members.*—Mr. H. Waddington who has recently left the District after being a Member for several years and who was Honorary Secretary in 1907-1908 and Dr. F. Milton Principal Medical Officer of the East India Tea and Produce and Meppadi Tea Companies, were elected Honorary Members.

1820. *Rules of the Association.*—Read report of the Committee made in accordance with resolutions passed at May and November Meetings 1912. This was agreed to. The rules as amended were ordered to be printed and circulated.

1821. *Shipment of teas during the Monsoon.*—Read correspondence in connection with the Special Meeting of this Association held to consider the question of complaints of tea shipped from Calicut and received in London in a damaged condition. Letters from Honorary Secretary to Messrs. Peirce, Leslie & Co., Messrs. Parry & Co., and Messrs. Harrisons & Crosfield in Calicut, and their replies. The following resolution was proposed by Mr. Gillatt, seconded by Mr. Stewart and carried. That this Association do ask the Honorary Secretary to write to the Coast Firms and point out that as all of the invoices despatched from this District from various Estates and shipped by the Clan Fraser during August have been reported on by the Brokers in London as having arrived in a musty condition that considering no reports have been received from the Coast Agents, who shipped the tea in question, as regards the various invoices having been received in anything but in satisfactory condition, that it is the opinion of the Association that the damage must have been caused after receipt by the Calicut Agents.

1822. *Shipment of tea from Madras.*—This subject which was also raised at the Special Meeting led to a correspondence with Messrs. Parry & Co., Madras, who are prepared to undertake to ship tea sent by this route; their charges from rail to ship being 8½ as. for full chests and 6½ annas for half chests. This rate would include warehousing for 4 weeks. It is unlikely that any cargo would be detained longer; but if it were, the cost would be 4·4⅛ pies per chest per week. Messrs. Parry & Co. shipped a quantity of tea from the West Coast at Madras during the 1909 monsoon with satisfactory results.

The S. I. Railway Traffic Manager writes that he is unable to further reduce the freight on tea from Calicut to Madras which remains at 6 annas per maund. The cost *via* Madras would therefore amount to, say, for a full chest, weighing 120 lbs. gross

Rail charge 6 as. per maund	0	9	0
Madras charges	0	8	6
Re.	1	1	6

in addition, to whatever was charged for forwarding in Calicut; against the present cost of 6 annas per chest, for shipping from Calicut.

1823. *Vayitri Munsiff's Court.*—Read letter from Honorary Secretary to Mr. Edgington, I. C. S., District Judge of South Malabar, about the statement in the *Madras Mail* that this court was to be removed to Feroke: and Mr. Edgington's reply informing that the information is inaccurate the proposal being to invest the Deputy Collector of Wynaad with Munsiff's powers, so as to set free the Munsiff for work in the plains.

1824. *School of Tropical Medicine.*—A circular has been received from Messrs. Harrisons and Crosfield asking for subscriptions to above, these should be sent to the Firms Quilon Branch.

Roads.—Read letter from Mr. Winterbotham complaining of the late date at which repairs and jungle cutting are being undertaken.

1826. *Postal Delays.*—Read letter from Mr. Winterbotham. The Honorary Secretary to write to the Superintendent of Post Offices, Calicut, about the detention of Wynaad parcels in Calicut.

1827. *Annual Report and Statement of Accounts.*—The Annual Report was read and ordered to be printed.

ANNUAL REPORT.

There have been eight meetings held during the year. We have lost two Members during the year one Mr. Atzenwiler by death and one by resignation. We have also heard with regret the death of Mr. Mackinlay who resigned when leaving India. Both his and Mr. Atzenwiler's names appear on the first list of Members of this Association when it was formed in 1873.

The member whom we have lost by resignation is Mr. Waddington whose departure from the District we all regret. He was a member of this Association for several years, he has represented the Association at Bangalore and was Honorary Secretary in 1907 and 1908. We have now 31 members on the roll, besides Honorary Members.

Rules and Membership.—This question has been postponed from time to time, and it is hoped it may now be considered settled.

Roads.—The only complaints that have reached the Association concerning District roads have been about the delay in consolidating metal, and the Coorg-Kartikolam Road which Mr Jackson describes as being in very bad order.

His complaint has been forwarded to the President of the Taluq Board, but no reply has yet been received. This road is the link between

Wynaad and Coorg, and the Coorg authorities keep it in good order to the frontier : but the 10 miles between that point and Kartikolam appears to be neglected. The funds allowed Rs. 150 a mile, should at least suffice to keep it in fit condition for traffic as a fair weather road.

The Sultan's Battery—Nellakotta road always a difficult one to keep up has been put in good order. Funds have been provided to rebuild the Chural Mulla bridge on the Vellera Mulla Road.

Town Nuisance Act.—Our request to have this Act applied to Meppadi has been complied with with satisfactory results.

Tea Cess.—All the Indian Tea Districts have joined in asking Government to renew the Cess for another 5 years. This request has now been complied with. Mr. J. Carson Parker, the U. P. A. S. I. Representative on the Tea Cess Committee, nearly succeeded in persuading that body to grant a bonus on the export of green tea.

Labour and Emigration.—As far as local conditions go I think there has been an improvement. But we have all felt the extra cost of work involved by the increase of coolies pay. There was a good deal of discussion at the Bangalore Meeting on this subject and it is obvious that the constant drain caused by emigration to the Straits and Ceylon is being felt not only by planters, but by native landowners, and by those Government Departments who are large employers of labour. Government will not interfere to prevent a cooly who can only earn 2 or 3 annas in his village going abroad to earn more. But they ought to see that ignorant coolies are not enticed to emigrate on false pretences. As Government's attitude is one of perfect contentment with the conditions under which emigration is carried on, we can only do our best to show coolies that they are better off in Indian Planting Districts than elsewhere. Mr. Martin has done valuable work for us by composing the labour advertisement which has attracted considerable attention. We ought to continue to work upon these lines and try to arrange as far as possible to avoid inter-district competition. A scheme of voluntary registration was brought forward at the Bangalore Meeting. and a Committee was appointed to receive the opinions of all District Associations on it, to harmonise them and to circulate a working Scheme before the next Annual Meeting with the idea of improving the labour position. As I had an opportunity of consulting you before I went to Bangalore, I stated that Wynaad would only agree to Registration if it received Government support in seeing that coolies indebted to planters in India did not emigrate. You have confirmed that. It seems plain that Maistries and Coolies would at any rate at first be alarmed at being registered, and that if they found they could avoid the process by emigrating, the inducements to do so would be increased. As Chairman I have taken steps to insure that every member of a District Association should have the opportunity of studying the proposals so that he could form an opinion on them.

The Committee have now received the views of most of the Associations. One is strongly in favour but does not think it goes far enough, one supports it on condition that the Registration Bureau is made a department of the U. P. A. S. I. Two Associations have frankly declared that they consider the Scheme unsuitable and will have nothing to do with it. The attitude of other Associations may be perhaps described as non-committal.

The Committee will be undertaking a difficult task if it attempts to produce a report that will please everybody.

Locally, we have had as much trouble as usual in getting defaulters arrested after warrants had been issued against them. Mr. Mullaly, the District Superintendent of Police, North Malabar who came to our Meeting in May suggested that planters in doubtful cases should enquire of the local Police as to the Maistry's standing before advancing him. This proposal which was accepted by us as likely to be of considerable assistance was agreed to by the Deputy Inspector-General, but was vetoed by the Inspector-General.

Sale of Westward Ho Bungalow.—This was sanctioned by the Association and carried through.

The Bungalow was built 12 years ago on the Panora Coy's land for the District Medical Officer to live in, and was occupied for about 6 years. The money was raised by the subscribers to the Medical Fund, not by the Association, but the deed was in the name of the Association. When the last Medical Officer left, the Bungalow was occupied by the Panora Co., on the understanding that if required again for a Doctor's residence it was to be given up. There was a movement early last year to get a European Doctor for the whole District. When this fell through, Mr. Malcolm offered to buy the bungalow, and after some negotiations a price was agreed on, and the transaction completed. When the purchase money was received it was decided to give grants out of it for repairs of Meppadi Church and improving the Meppadi and Vayitri Clubs. These are shown in the Accounts. But it should be clearly understood that none of the payments have come out of the money subscribed for the Wynaad Planters' Association.

S. I. P. Benevolent Fund.—I would again draw your attention to the small number of subscribers in this District. There are only 6. The Fund ought to be supported by Members of Association and by Proprietors. The individual subscription is only Rs. 10 a year. The payment of Rs. 200 by a Proprietor or by a Company, entitles the Superintendent of any one Estate to be helped by the Fund during the lifetime of the Proprietor or for 20 years in the case of a Company. Happily we have not so far had many applications for assistance, but some hard cases have been helped. Anyone who reads the report of the Ceylon Planters' Fund will appreciate what good work may be done, and also how largely the Fund is supported there.

The Accounts for 1912 are now before you for examination, and I ask you to pass them if found correct and to accept my resignation.

The Accounts were passed and the sum of Rs.61-2-9 which appears to be irrecoverable is to be written off. Mr. Abbott was thanked for his services during the year, and was re-elected Honorary Secretary.

1828. *Meetings in* 1913.—It is proposed to hold the Ordinary General Meetings on the first Wednesdays of each month, except February, April, May and June.

A vote of thanks to the Chair terminated the Proceedings,

(Signed) C. LUMSDEN EGAN,
Chairman.

(„) C. E. ABBOTT,
Hony. Secretary.

Note.- Mr. G. R. Briggs will be proposed for election at the next Meeting.

EXPLOSIVES AS AN AID TO AGRICULTURE.

We lately published an article under the above heading by a correspondent, but it must not be thought that this subject had been overlooked by us, and that it came as a surprise. On the contrary it had been followed carefully and further information was being collected. The use of Explosives in opening up new land is not a new one, but has been in use for some time in the Colonies, South Africa and America. The amount of Explosives sold to farmers in America amounts probably to 600,000 cases and in the Transvaal 800,000 cases, but many difficulties will have to be faced and overcome before the use of explosives becomes general in the East. It is with its application in opening up new land in India that we are most concerned. It is hedged round with all sorts of precautionary laws. Plans for special houses for storage have to be built in places submitted to and passed by an Inspector of Explosives and licenses obtained. These are obstacles that can be overcome, but at present the chief obstacle undoubtedly is that of transport. Most estates are situated far away from Railway communication and Government would require before giving permission for its transport a long miles of road, to issue rules and regulations, harassing in themselves, but necessary for the public safety. Transit wiil add considerably to the cost but this will be faced and overcome by the planter who has mastered greater difficulties and expenses in the past. The question will arise is the cost justified? We believe it will be. Looking to the future, the planter and agriculturist will do well to face the initial expense foreseeing fields of tea, coffee and rubber without terrible eyesore of patches going out from stump rot. The eye of the agriculturist will be gladdened by fields of bumper crops of cereals due to deeper cultivation than can be reached by the plough. Prevention will be better than cure in such a case, if as we are assured "deleterious soil bacteria are destroyed in the process." This applies to the opening up of large areas of land for rubber, tea coffee and all cereals, but there is no reason why with reduced charges which must be learnt and tested by experiment, exp'osives should not be tried in growing fields with the best results. The present system of close planting will be revolutionized. Fewer trees will be planted to the acre and consequently less expense will be incurred per acre. For the first few years weeding will be slightly more expensive but the plants finding more generous feeding ground will expand and cover the ground and crops will increase abundantly. The expense entailed by the use of Explosives will be far more than covered by the returns due to more room and light and freer soil to feed on.

Professor Bose and Sir James Dewar have shown the relations between plant and animal life are analagous, and if man was treated in the same way as a plant his growth would become stunted. The roots of a tree require as much attention as the leaves themselves. We take from the America Agricultural Bulletin entitled the Breath of Life the following:—

"Everyone is familiar with the way in which animals breathe but many never stop to realize that plants—ordinary corn, cotton, grass in the fields—have organs of respiration that are just as elaborate as those of animals. The nostrils and the lungs of the animals are replaced in the plants by tiny openings in the leaves and roots that have such thin coverings that they can absorb air. The leaves have at all times an abundant supply of air from which to draw just what is wanted but the roots are not all times so favoured. If the roots are insufficiently supplied with air they are not able to do their work properly and the leaves are held in check at the same time by the faulty development of the roots.

"Some of the things that are necessary for the proper development of the roots are air, moisture foods that will dissolve in the soil water, temperature that is not too cold and a soil in which it is possible to spread out and grow easily.

"Most of the breathing of the plant is done by the leaves, yet a small but necessary part is carried on by the roots. This renders it necessary that the soil be well ventilated by numerous small openings between the particles. The water-logged or very wet sub-soils act the same as the packed soils in excluding the air; for the air cannot pass down through the openings choked up with excessive amounts of water. Some plants like Cypress tress overcome these conditions by root modification which allow breathing, but the crop growing in the fields and garden cannot do this, so it is necessary to furnish them air down in the ground. The plant root must also take up from the soil all the mineral food necessary for its development. These must be in such form that they will dissolve in the soil moisture readily enough to keep the plant from starving,

"Many of the minerals furnishing these necessary foods are too slowly dissolved to be of benefit to the plant until they are acted upon by the air and are caused to undergo very great changes, These changes are brought about but slowly in tight clay soils, sub-soils and hard-pan. While these changes in the nature of the minerals are being made by the air, great hosts of small bacteria are assisting in the same work. Some helping to break down one mineral and some another. These classes of bacteria must have an abundant supply of air for if caused to remain at any length of time in foul air or without air, they die and are replaced by others that may set about to undo the work already accomplished."

The above shows how necessary it is to cultivate the roots of a plant. The loosening and deepening of the soil, giving roots free scope to spread cannot but have the best results. Who, among planters, has not seen the effect on their own estates of some monarch of the forest blown down and uprooted in a gale of wind and the subsequent marvellous improvement of the growing coffee. This is due to the soil having been disturbed and fissured to a depth not possible for a manual labour to reach, To achieve the same object the use of explosives should be experimented with, though it should be remembered that in other countries their use has gone beyond the experimental stage. "Capital" in a leading article on the subject, says "before taking final leave of the subject, the experience of a lady fruit grower in Oregon is worth referring to. She has tried both methods of planting and is enthusiastic in her appreciation of the dynamite system. The trees planted in her dynamite holes grow twice as quickly as those set in the usual spade holes, and the difference between the two systems with trees of the same age set side by side was very marked. This lady was so impressed with the success of this method and the stronger and more luxurious growth of the trees planted in this manner, that she planted one whole orchard entirely with dynamite. In fact she has become so wedded to the system that she broke sticks of dynamite in halves and used a moeity for each tree of a rose bed, as well as planting the perennials in her flower borders in the same way. And in every instance the end had more than justified the means."

To those who are so happily situated that they can call in the aid of electricty to explode numerous charges at once, instead of one at a time, the cost will be considerably reduced. We are of opinion the system advocated should be given a trial. We are much indebted to the *Indian Planters' Gazette* for much of the information given in this article.

TEA.

Tea Pests in Ceylon.

(From the Report of the Government Entomologist.)

TEA PEST.

"Shot-hole Borer" (*Xyleborus fornicatus*) is still the principal subject of inquiry. There has been no marked increase in its range. I have occasional reports of its appearance on estates upon which it had not been observed before; but these have usually been situated in previously infected districts. The Dikoya and Maskeliya districts and the greater part of Dimbula still remain free, and may continue to escape infection of care if taken to avoid the introduction of tea plants grown in infected localities. There is no doubt that the best would never have established itself so widely had it not been for the constant employment of outside nursery plants instead of seed. If all plants for new clearings were grown on the place where they were required, there would be little or no danger of the introduction of the borer, for seed is never infested.

At the instance of certain districts, "Shot-hole Borer" has been proclaimed as a pest under the Plants Pests Ordinance of 1907. This Proclamation appeared in the *Government Gazette* No. 5498 of April 12, 1912, p. 387. The schedule recommends the "prohibition of the removal of tea plants or parts of tea plants (other than leaf for manufacture aud tea seed) from estates infested by the borer, or the reception of such plants or parts of plants or any estate within the prescribed area." No action can be taken until a local board has been appointed and, when that has been effected, action is restricted to the "revenue district" governed by that Board. The appointment of a Board is dependent upon the wishes of the planting community in any particular district, expressed through their local Association. It is clearly not in the interests of any badly infected district to be placed under the Ordinance. Being already infected, they have little to gain and something to lose, as they would then be prohibited from disposing of their surplus tea plants. If, on the other hand, a district that is at present free from the pest is provided with a Board under the Ordinance, it has everything to gain but nothing to lose, for it could insist upon the prohibitation given in the schedule, namely, against the reception (by any estates within their area) of plants from an infected district, while, being themselves uninfected, there is no bar to the sale of their own plants. At present they are at the mercy of any careless or thoughtless person who may be prepared to run the risk himself, regardless of the danger to his neighbours.

The question of the utility of the predaceous beetle (*Clerus formicarius*) as a possible enemy of "Shot-hole Borer," has been finally set at rest by the receipt of a few living larvæ of that insect. It was at once apparent that these larvae were several sizes too large to be of any use to us. When quite young, they might be able to traverse the minute galleries of the borer; but they would soon outgrow this possibility. They would be unable to complete their transformations and, consequently, could never establish themselves permanently in the tea bushes.

TEA TORTRIX, HELOPELTIS AND OTHERS.

"Tea Tortrix," (*Capua coffearia*) has been reported from several districts, but trouble from this pest has been much less general than in previous years. This may be due, partly to a greater amount of rain during the early months of the year, which favours disease amongst the caterpillars, and partly to better cultivation.

There has been a marked scarcity of complaints of other caterpillar pests. I have received no notice of "Nettle Grub" (*Limacodidae*). Isolated outbreaks of "Red Slug" (*Heterusia cingala*) and *Caradrina reclusa* have been reported from the Kalutara and Deiyaya districts respectively. Two instances of minor attacks of the "Small Tussock" caterpillar (*Orgyia postica*) have occurred in the Deniyaya and Balangoda districts.

Helopeltis, also, has attracted very little attention, a single complaint from the Galle District and another from Kadugannawa being the only instances that have been brought to my notice.

"Yellow Tea Mite" (*Tarsonymus translucens*) has been reported from the Galle District.

Calotermes militaris, a "white ant" that hollows out the stems of living tea bushes, still occurs sporadically on some of the Lindula estates. Apparently the only cure for this pest, whicb breeds inside the stems, is to dig out and burn the affected trees.

Some seedling plants from the Ambawella district were found to be badly infested by a large "eel-worm" distinct from the common *Heterodera radicola*.

A very remarkable case of Infestation of manufactured Tea by a Dermestes Beetle has been investigated. The tea was packed in the usual way and samples were retained in the Colombo Agent's Office. Those samples show no trace of infection. But when the chests were opened, in Europe, the tea was found to be alive with beetles and fouled by the dead bodies of their larvæ and pupæ. The lead lining of the chests was said to be imperforate. No explanation of the presence of the insects is, at present, forthcoming. The tea was otherwise in good condition, being dry and without any signs of decay. There was nothing that would appear to be attractive to an insect of this genus. Indeed, in the sample that was submitted to me, there was no evidence that the beetles had been feeding upon the tea at all. Closely allied species of *Dermestes* are known to attack and breed in hides bacon, dried fish, &c, If only a single chest had been affected we might suppose that some foreign matter had been accidently included in the tea. But chest after chest was opened and found to be similarly infested. The whole affair is a mystery.—*Ceylon Observer.*

The Rubber World says of North Borneo:—

In the Trade figures Estate rubber heads the list of increases, 149,000 lbs. valued at $352,000 having been shipped as compared with 54,000 lbs. valued at $196,000 in 1910. The report adds that "succeeding years should show this increase not only maintained but largely augmented as more estates come into bearing." Prices ranged well at the top of the market, Woodford Estate being actually at the head of the London November sales of smoked sheet: Padas Valley on one occasion realised 5s. 1d. per lb. On Pitas estate 476 trees planted in 1898 give an average of 3·84 lbs. of rubber per tree. Three more estates were expected to commence tapping in 1912. Very little disease is repórted and the little has been kept well in check. A number of Chinese are planting rubber on their small holdings. With the exception of two estates which have failed "there is not an estate in the country which cán be regarded as other than a fair investment."

The Planters' Chronicle.

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(INCORPORATED.)

Contents

The Government Entomologist continues his report in this number and it is hoped that every advantage will be taken of his able assistance and advice which will add so much to our knowledge of the pollination of Coffee —and those Districts named in his report, are especially asked to give him timely warning of rain, so that his arrangements can be made.

The Scientific Officer writes on the subject of the checking of Fertilizer guarantees and gives advice as to the best method of taking samples and it is to be noted that the samples should be sent to this office not later than March 20th if possible.

A Paper read before the Agricultural Society of Trinidad and Tobago on the use of explosives is largely reproduced. Though dealing mostly with Cocoanuts and Fruit trees, many useful suggestions are given as to the opening of land from which much may be learnt; and an article of an experiment made with dynamite in growing tea will be of much interest to all Tea Planters. It is suggested that as regards cost, dynamite cannot compete with manual labour in the tea districts, but it is rather too early to form a decided opinion on this point, and it is to be hoped that the experiment will be continued. If the cost can be curtailed one cannot but foresee the happiest results.

Messrs. Schimmels report on Cardamoms will be of interest to Cardamom growers, and if caution is exercised in the selection of seed there is no reason why their cultivation should not, as a bye-product, continue to pay— as the export to England is increasing for the extraction of oil.

Mr. Carson-Parker, the United Planters' Association's Representative on the Tea Cess Committee wrote a letter to the Chairman, which we publish for the information of all Planters.

We regret that we have no more letters on the Labour Question to publish this week. The subject is so important that we hope that we may receive more, that will shed a ray of light on this vexed question.

BEES AND THE FERTILISATION OF COFFEE.

[*Continued.*]

PROPOSED EXPERIMENTS.

On 24th January a letter was received from the Government Entomologist containing suggestions for experiments to be carried out to determine the influence of insects, especially Honey-Bees, on the Pollination of Coffee Flowers. The following are extracts from this letter:—

DISTRICT IN WHICH EXPERIMENTS ARE TO BE MADE.

"The Planting Communities of the Shevaroy Hills, Mysore (Bababudins), and South Coorg are the only ones which have so far signified their desire for these experiments to be undertaken in their respective areas. For the present year, therefore, it is proposed to confine the experiments to the Districts named above.

"I would point out, however, that the value and interest of any experiments and observations of this nature would be considerably enhanced if they could be checked by comparison with similar experiments and observations in other districts (such as the Anamalai Hills and Travancore) where the conditions are apparently more favourable for the successful pollination of coffee. The Planting Communities of these more favoured Districts have not, it is true, seen any necessity for any investigation into this subject, because they are already satisfied with their out-turn, but such investigations would perhaps prove of considerable value in considering the possibility of increasing the out-turn of the less favoured areas.

STAFF REQUIRED TO CARRY OUT THE EXPERIMENTS.

"I think that, to minimise risk of errors, the experiments should be carried out in duplicate in each District. We shall therefore require two observers each in the Shevaroys, Bababudins, and South Coorg.

"As you are aware, I am at present under orders to proceed to Pusa to take over the duties of Imperial Entomologist as soon as I am relieved here at Coimbatore. As to who my successor will be, or when he will arrive, I am as yet without any information but it is probable that he will reach Coimbatore sometime in March. If this is so, it will rather upset the experiments as, if I have got to Pusa just before the Coffee-flowering season, it will be practically impossible for me to leave again at once to come down for these experiments. I might be able to take over charge by telegraph and remain down here until after the experiments, but this course would require special Government sanction. In any case, at present I cannot make any *definite* arrangements about my own share until I hear reliable news about my successor. I would propose however, that:—

(*a.*) The Government Entomologist (either myself, if still here, or my successor, if he has then arrived) should carry out one set of the experiments in the Shevaroys.

(*b.*) The Assistant in Mysore (Mr. Frattini) should carry out one set in the Bababudins.

(*c.*) The Assistant in Coorg (Mr. Jonas) should carry out one set in South Coorg.

"A second experimenter in each District will therefore be required to carry out the duplicate set of experiments, and I shall be glad if you will be good enough to ask the Secretaries of the Planters' Associations concerned to secure a reliable volunteer in each District and to let me know his name and address so that the necessary apparatus may be sent to him direct.

"Should I be relieved before the Flowering-season and allowed to stay down here to carry out these experiments, I would suggest that I should myself revisit the Pollibetta District in Coorg and make an extra set of experiments and observations in that District. As, however, it is at present doubtful whether this will be possible I cannot offer to replace one of the regular experimenters and my functions would only be *supplementary* to theirs.

TIME OF FLOWERING SEASON.

"I understand that the Flowering season of Coffee, which is very short —only of three or four days' duration at the utmost—follows about ten days after the early rains, commonly called Blossom Showers. and that these usually arrive any time between about 20th March and 10th April.

"I do not know whether there is much variation in the coincidence of these Blossom Showers in the three districts concerned, but I would recommend that the Secretaries of the Planters' Associations concerned should inform me by telegraph (a) when the banking of clouds seem to herald the approach of these showers, and (b) when the showers actually fall, giving in the second case an estimate of the date on which the blossom will be open.

From here the Shevaroys are distant roughly one day, the Bababudins three days, and South Coorg four days, and the experimenters and observers should be ready two or three days before-hand. At the same time the Secretaries should similarly warn the local Assistants and Volunteer Helpers to be in readiness.

"The first information required above under heading (a) would enable me to get touring-apparatus etc., prepared and, if necessary, to recall to Head Quarters any of my Staff who might then be away and be required for the work.

(*To be continued.*)

The *Statesman* writes in its issue of the 1st instant:—"There are few more curious examples of official inconsistency than the attitude of the Indian Government towards indentured labour. Why in the world should a form of coolie-recruiting which is forbidden to the tea planters of Assam, be permitted to the sugar-growers of distant colonies? The question will force itself upon every reader of "Fiji of to-day," a book written by Mr. J. W. Burton and published with an introduction by the Rev. A. T. Small, Chairman of the Methodist Mission in the Islands. Three thousand Indians, Mr. Burton tells us, are needed annually to carry on the business of the colony. The net cost of these human agricultural implements amounts to about £16 an adult inclusive of transit; and in return for this payment, the master obtains the services of a coolie for five years. "Five years hard labour," Mr. Burton calls the coolie's share of the bargain. Unless his narrative be greatly exaggerated—as we have no reason for supposing it to be—the phrase very inadequately indicates the miseries suffered by some of the victims of indentured immigration. Among them we are told are "men of education, high caste and refinement, who have been inveigled by the glowing tales of recruiting agents in India. They believe these tales and on arrival in the land of promise find themselves drafted to a sugar estate and knocked about by overseers and put to the hardest form of manual labour. Mr. Burton admits that Indians who have served their term and settled down in the island, constitute industrially the most important element in the Fijian community; but this fact does not compensate for the evils disclosed. At its best the indenture system is a degrading method of employment and the sooner the Government puts a stop to it the better.—*Indian Planters' Gazette.*

THE SCIENTIFIC DEPARTMENT, U.P.A.S.I.

Checking of Fertiliser Guarantees.—At the Annual Meeting of the U. P. A. S. I. in 1912 the following resolution proposed by the Delegate for the Bababudins and seconded by the Delegate for Coorg was passed:—

"That the Scientific Department be asked to try and see their way to periodically verify the guaranteed analyses of manures sold by different manure firms. It has been suggested that if the Scientific Officer has too much to do to undertake the analyses that perhaps the Assistants for Mysore and Coorg might be spared for a month in the year to undertake those analyses."

The District Planters' Associations were circulated on the subject and those who accepted this offer intimated that the necessary samples would be sent in during February and March and again in September. It has consequently been arranged that the Scientific Assistant for Mysore will come to Bangalore early in April to assist in the work of checking guarantees. It will be impossible to undertake the work sooner this year as the Scientific Officer will be away on tour during March.

It is proposed when the samples are received to sort them into groups and check the guarantees of each group from the different firms, *e. g.*, Poonacs, Superphosphates, Mixtures, &c. If these bulked samples come up to guarantee, things are evidently as they should be. If they do not the particular sample under guarantee will be discovered. Consequently, every planter who sends a sample will not necessarily receive an analysis of his fertiliser, but the general results will be published in the *Chronicle*.

The samples sent in must be carefully taken so that they truly represent the bulk.

When taking samples out of bags, a number of different bags must be sampled and the samples drawn from different places in each bag; from the bottom of one, the top of the next, the middle of a third and so on. If the manure is in a heap, samples should be drawn in the same way from different places in the heap, not neglecting the interior. The different samples are then thoroughly mixed on a clean bag, or floor, and about 2 lbs. finally put in a *clean* bag, labelled and forwarded for analysis.

In the case of mineral fertilisers like saltpetre, nitrate of soda, &c., about 8 ounces is sufficient for analysis and the sample is conveniently forwarded in a *clean, dry* bottle.

Each sample must be clearly labelled and should be accompanied by a covering letter stating from what firm the manure it represents was bought, its price, and its guarantee. These samples should be sent in not later, if possible, than 20th March addressed to the Secretary, U. P. A. S. I., Bangalore.

If a representative number of samples are received with these data valuable figures will be obtained showing the cost and standard of manures usually used on estates in Southern India.

Scientific Officer's Tour.—The Scientific Officer will leave Bangalore on the 22nd February to make a tour of the Lower Pulneys and the Kanan Devan Districts. He expects to be away from headquarters five or six weeks. All correspondence should be addressed as usual to Bangalore from where it will be forwarded.

R. D. A.

EXPLOSIVES IN AGRICULTURE.

The use of dynamite in aid of agriculture has interested us greatly and doubtless the Planting Community of Southern India too, and with the intention of encouraging its adoption or trial, we reproduce a paper read by Mr. Harry Vincent before the Agricultural Society. It is most significant that the use of dynamite has more than doubled the crops in the United States of America. Though the use of dynamite in agriculture has been known for a long time it is only comparatively recently that it has come into prominence, and is called the New Cult. Though the paper refers to Cocoanuts, cocoa and other products, the opening of the land for coffee, tea rubber and cereals is analogous. The object of drawing attention to the use of dynamite in all lands being opened in Southern India is to inculcate the value of deepening the land below the existing hard pan and loosening and fissuring the soil below for the benefit of the roots. In connection with this same object, we publish from the *Indian Planters' Gazette* a very interesting letter on an experiment made on a tea estate under cultivation.

" Blasting the subsoil by means of dynamite cartridges has in the United States of America within the past few years more than doubled the crops in all localities when thay have been used. Fruit trees planted in dynamited holes at three years old are finer and healthier than those of six years planted by the spade, for this tool packs the earth round the roots and retards growth, while corn grown in land prepared by dynamite has yielded over 200 bushels to the acre. The chief advantages claimed for the new cult are :—

Six feet in depth of disintegrated plant food for the tree, in place of eighteen inches given by the spade hole.

Loosening and aerating the soil, rendering it porous, in order that the young tree may absorb as much moisture as possible. Conservation of water is an absolute necessity for the roots.

All agricultural crops, more especially the Sugar-cane, have suffered extremely from insects and fungus diseases, consequent on the late severe drought. The explosion of dynamite loosens the earth for yards round the spot, kills all insects likely to injure the young tree, giving it that healthy start which is the best resistant against pest of all kinds.

THE COMPARATIVE SECURITY IN HANDLING DYNAMITE CARTRIDGES.

As there is considerable misconception about the danger of handling dynamite, I must preface this paper by some remarks on the comparative safety in the manipulation of this product. When cellulose, a carbohydrate, is treated with nitric acid, the action of which is increased by sulphuric acid, the mixture of these acids is known as *Nitroacid.* "Now when the Nitroacid is mixed with glycerine, it forms the high explosive called Nitro-Glycerine." If from 25 to 40 per cent. of this explosive is incorporated with the fine sand or infusorial earth called " Kieselguhr " wood-pulp and other harmless ingredients and made into cartridges (8 inches long by 1¼ diameter ½ lb. in weight) this product is called dynamite, and the cartridges can be handled with absolute security if a few simple precautions are taken, as explosion can only be caused by the sharp percussion of a detonator. As a matter of fact they are not as dangerous as gasoline, carbide or gun-powder. It should here be noticed that the gases evolved by the explosion of dynamite are highly noxious to insect life, consisting as they do of approximately 48 per cent. Nitric oxide No, 12 per cent. carbon dioxide CO, and 35 per cent carbon monoxide CO. The cartridge becomes an object for much care and circumspection after the detonator has been affixed, and as this is done just immediately befor lowering into the bore-hole for blasting the danger is practically nil. In the U. S. A. where the use of dynamite for agricultural purposes was intimated over 20 years ago, the "cult" has been advancing by leaps and bounds, so that now nearly all up-to-date farmers have their own small magazine for dynamite.

There are over half a million people treating their lands with it daily and the percentage of accidents from its use was in 1910 only $\frac{1}{8}$ of 1 per cent. and they were all caused by extreme carelessness. When I was in New York in 1910 a tremendous explosion occurred at Jersey City causing the death of nearly 40 persons. It appears that a steam tug at a wharf alongside the railway lines was being loaded with black powder. An accident accurred on board, I believe the boiler blew up, the boat caught fire and subsequently the powder also. There happened to be several cars loaded with cases of the "Red Cross dynamite cartridge of 50 lbs. each on the adjacent lines. These cars were completely wrecked and boxes scattered all over the tracks. Many of them were burst open and the contents thrown loosely about and not a single cartridge exploded. The experts said at the time, if the dynamite had gone off, the concussion would have blown away the lower half of Manhattan Island. This ought to be a pretty good proof of the immunity of these cartridges from accidents.

"PURPOSES" to which these cartridges can be profitably applied in Trinidad ;—

Planting Cocoanuts, Cocoa and Fruit trees generally. *Re-juvenating the same.*

Close Subsoil-blasting for the destruction of insects and fungus pests, and doubling the out-put on sugar-cane, cotton and corn lands.

Stump-blasting.—New lands and pastures

Swamp-draining for lagoons and bogs.

Pipe-line Trenching for oil lines.

Road building for grading and trenching.

Boulder-blasting for breaking np rocks and opening up gravel and lime pits.

PLANTING COCOANUTS, COCOA AND OTHER FRUITS.

The action of dynamite cartridges loosens and acrates the soil rendering it porous in order that the young tree may absorb as much moisture as possible. Conservation of water is absolutely necessary for roots (especially with the dry wet seasons we are having). Soil which becomes so compact as to stop the air passages is too wet for most crops and needs drainage, for plant roots must be supplied with air, and soil must be porous for its free circulation. Few persons realize the depth of tree root expansion. A healthy fruit tree under normal conditions will send its roots 10 to 20 feet downwards in the soil to find food, but if it encounters at a depth of 4 or 5 feet a layer of *sour* hard pan it must spread out laterally 20 feet or more, and the result of this unnatural side-wise growth is that each tree in the field is compelled to go over the feeding supply of its neighbours. Result, starvation from want of proper nourishment. a lessened output of fruit and should drought intervene death of the tree from imperfect moisture in a thin feeding ground.

Too much stress cannot be laid upon the importance of having the subsoil broken up and pulverized in order that the tree roots may obtain a healthy downward growth. We all know the result of leaving a strong healthy plant in a pot that has become too small for it. When it is turned out it is found to be pot-bound, that is full of callous and cramped roots. What then becomes of the "Consols of the East" or the "Cocoa dividends?" if the same conditions pertain more or less (which it undoubtedly does) to the trees in the plantation, as the ordinary spade-hole only opens up 12 to 18 inches of the soil, leaving a solid wall round the young plant? There are two methods in vogue for agricultural blasting, one by detonator and fuse which is the cheaper and more generally used for sub-soil blasting and the other by electric fuse. By the latter system a number of cartridges can be exploded simultaneously, but the preliminary outlay for blasting machine and electric fuse is of course more expensive.

The field to be prepared for tree planting having been lined out and a picket placed at each distance where a planting hole is required, a bore-hole from 24 to 30 inches deep must be made with either an earth-auger or sharp iron crow-bar. A half pound dynamite cartridge primed with detonator. cap, and three feet of fuse is then lowered into the hole and gently but firmly tamped with moist but not wet dirt, by means of a wooden stick until the bore-hole is filled even with the surface. Care must be taken to tamp the earth as hard and firm as possible or the bore-holes may blow out and half the energy of the explosive be wasted. The demonstrator then lights the end of the fuse and retires some 30 paces to await eventualities. After the successful explosion each site will be found full of broken and pulverized earth ready for the young tree's reception.

N.B.—The Cartridge should not be primed until the bore-holes are ready, and they must be handled with gloves. If handled with the bare hands a headache will be the result.

RE-JUVENATING COCOA, COCOANUT AND FRUIT TREES GENERALLY.

On most fruit plantations of a certain age, the manager will note that certain fields have gone back to him and that their return is variable and almost negligible. This he will possibly put down to old age but in the majority of cases it will be found, mal-nutrition. If he digs round and about his hide-bound trees, he will find an absolutely dry and inert soil of putty-like appearance, as devoid of nourishment as megas is of sugar. When the trees to be operated on are in an extremely poor condition the bore-hole should be made 6 feet from the tree, driven down 3 feet at an acute angle in the direction of its roots and therein a half dynamite cartridge (½ lb.) exploded. But for the cultivation of ordinary trees that have been yielding poorly (in all probability because the roots have stuck an impenetrable sub-soil.)

For cocoa trees, it will be advisable to bore the holes 3 feet deep for half cartridge (¼ lb.) midway between the trees on diagonal lines and on.

Cocoanuts to bore the holes 3 feet deep for whole cartridges (½ lb.) midway between them on square lines.

Close sub-soil blasting, for the destruction of insects and fungus pests and doubling the out-put on sugar cane, cotton and corn lands.

That the comparatively poor ratoon crops reaped from sugar-cane and pineapples is mainly due to the compactness of the soil beneath the depth to which the ordinary cultivation extends has been indubitably proved by the experts of the tropical agricultural stations of the U. S. A. This compactness is caused by the combined effect of moisture and pressure. Water cannot percolate the soil thoroughly in this condition, neither can air. Without aeration, the nitrogen in the land becomes unavailable and in red clay soils, the chemical state of the iron salts becomes unfavourable. No matter how thoroughly the top soil may have been tilled for the plants, in a few months to this inert, concrete condition (especially damp clay, low lying soils) must the sub-soil come, unless it has been tile-drained, which is too expensive under present market conditions. Close dynamiting answers the same purpose as the sub-soil drain and its effects are good for ten years according to the returns of the Southern Planters' U. S. A., and they have been using the cartridges for a longer period. Experience has shown that the sub-soil in a given area of land will be thoroughly cracked up, if half cartridges are exploded in bore-holes ten feet apart both ways as these cracks will meet.

As regards insect pests, of course I have no records anent the frog-hopper, but I expect to get some other cane plagues from Louisiana and Hawaii. I have however a record from Georgia where "wooly Aphis" was known to abound. In orchards that have been dynamited, there is no evidence of their presence.

The most suitable time for dynamiting in cane lands would be dry season, especially for pieces to be kept as ratoons, preferably a month after cutting when the sprouts have begun to make a showing. The bore-hole must be dug straight down two feet at intervals of 10 feet (if the field is 5 x 5 lining) the first hole being made in the centre of the row and so on until the piece is finished. In stiff, moist clays a quarter cartridge (⅛) will be sufficient but light sandy soils will require a half cartridge. (¼ lb.) There will not be the slightest chance of injury to the cane stoles, the field will be sub-soil drained, the larvae of the frog-hoppers destroyed by shock and the nitrous fumes of the gases and the out-put of sugar in all probability more than doubled at the subsequent reaping. I have just read Press Bulletin No. 38 (dated 25th October) 12, of the "HAWAII." Agricultural Experiment Station "HONOLULU." This contains an article on the "Use of Dynamite in Farming" by E. V. Wilcox, Special Agent in Charge. Therein he has stated that dynamite has been in use there for four years, and as Honolulu is in the same isotherm as Jamaica I will quote a couple of extracts. "For tree planting dynamite is confidently recommended as the best method of preparing the soil." "If the cost of dynamiting does not exceed 25.00 per acre it will thus be seen that this special mode of preparation is a profitable investment from the standpoint of the physical condition brought about in the soil and the subsequent increase in crop yield."

STUMP BLASTING FOR NEW LANDS.

In blasting stumps the amount of charge to be used and the position where it is to be placed will depend on local conditions such as nature of soil, and the way the roots of the stumps lie. It is generally advisable to place the bore-hole under the centre of the stump so that the middle part which naturally offers greatest resistance will be hit first and hardest. Stumps in heavy clay will require lighter charges than those in light sandy soil, and while it is preferable to blast damp clay land in dry weather, work done in light sandy soils will be more thoroughly accomplished when the earth is damp. In the United States a regular graded table has been formed as to the number of cartridges to be used according to the diameter of the stump ranging from 1½ cartridges for 12″ diameter up to 8 cartridges for 48″ diameter all cartridges to contain 40 per cent. extra dynamite.

BLASTING TRENCHES FOR OIL PIPE LINES.

To blast a trench for laying oil-pipe lines. a row of holes must be punched 1½ inches in diameter at spaces of 2 feet apart, down to within 4 inches of the grade of the trench, and in such a position that the bottoms of the holes will follow the centre line of it. Into each hole a half cartridge 40 per cent. extra dynamite should be dropped and pushed firmly to the bottom with a wooden stick. When the holes have been punched for four or five hundred feet, the charging of the holes should be started at the ends of the trench and finished at the middle. The three last holes should be charged with two cartridges each. and the last cartridge loaded in the middle hole should be primed with a blasting cap fuse. No Tamping required. Just as the primer is in position everybody should be warned off the trench, and the fuse lighted, the blaster of course retiring to a safe distance. The charge in the middle hole explodes those in the holes on either side, and the effect of these two is carried to the next ones. and so on almost instantaneously to the opposite ends of the ditch. In this way trenches can be dug up to 3 to 4 feet deep, 3 feet wide at the bottom and 5 to 7 feet wide at the top.

ROAD BUILDING FOR GARDENING AND TRENCHING.

Road-grading and trenching always takes more or less digging, but by using dynamite to loosen up the hard ground or shale, and to blast out the rocks they can be built quickly and at comparatively little expense. To blast cuts not more than 5 feet deep through hard earth or shale. a bar should be driven down to within 6 inches of grade and the bore-holes spaced from 5 to 9 feet apart. In each hole a primed extra 40 per cent. dynamite cartridge (½ lb.) placed, and the hole then thoroughly tamped. If it is necessary to cut through rock, the holes should be spaced a bit closer. In this way the material to be removed is not only broken up so that it can be shovelled very easily, but a good portion of it spread over the surrounding land and does not have to be handled.

The processes for swamp draining and boulder blasting are not qulte so simple as the preceding operations and require wiring for electric fuses, and the use of the electric blasting machine.

Any person anxious for information under this head can apply to the writer, who will give all information.

COST.

I am not very able to state exactly what will be the cost per acre for the different varieties of cultivation in Trinidad as the freight and duty will have to be reckoned with. I am hoping to approach the Government for the remission of import duty, as there is really a great need for dynamite for general agriculture. Much of course depends on the distances at which the bore-holes will have to be sunk. Preparation of lands for Cocoanuts will be naturally cheaper than for Cocoa, sugar-cane, corn, cotton, etc. In the United States the cost per acre according to the different cultivations varies from $10'00 to 25'90. This sounds expensive but a double return from the fields will show that the end justified the outlay.—*Agricultural Society of Trinidad and Tobago.*

Mr. J. Carson Parker, the Association's Representative on the Tea Cess Committee has written the following letter to the Chairman, and as time is pressing, suggestions should be forwarded as early as possible to the Secretary :—

Meppadi, 10th February, 1913.

C. E. ABBOTT, Esq.,
Chairman, U. P. A. S. I.
Meppadi.

Dear Sir,

I have to inform you that the Annual Meeting of the Indian Tea Cess Committee will be held on March 14th at Calcutta and I shall be glad to know of any matter you want brought up at the Meeting.

Yours faithfully,
(Signed) J. CARSON PARKER.

TEA.

Dynamite in Tea Cultivation.

EXPERIMENTS AT SATHGAO TEA ESTATE.

Maulvie Bazaar, 30th January.

A most interesting and instructive demonstration took place at Sathgao' Tea Estate, South Sylhet, on the 27th instant, where a large and representative number of the tea planters from the surrounding districts were entertained to luncheon by Captain and Mrs. Robert Fraser. The special object of the meeting was to witness a demonstration of sub-soil cultivation with dynamite. Messrs. Nobel's representative, Mr. Macqueen, conducted the experiments, and throughout the operations explained everything so clearly and simply that all who were in attendance could have no hesitation at any time in the future in undertaking similar work with dynamite. Hardpan must not exist if we are to have a top crop with a good quality tea. This is becoming to be so well understood amongst the planting community that it is almost accepted as a hard and fast rule. There are different kinds of hardpan depending upon the material of which they are composed. One kind of hardpan is a hard layer of clay which is sometimes found below the ordinary open sub-soil. Another is a kind of cemented gravel, and the one with which we are most familiar in the districts is composed of a mixture of "kanker" gravel set in a matrix of a red iron clay. We are in the habit of calling it "laterite," a name which might apply to any kind of red soil, but as the nature and origin of true laterite is somewhat obscure, we may leave it at that.

There is one thing very certain: surface soil cultivation has a tendency to increase the impermeability of all kinds of hardpan. The continual surface cultivation assists the rain water to carry the finer portions of the soil in suspension downwards. When this finer part of the soil reaches below the usual cultivation it sticks there and assists very effectully in cementing any rougher material it comes amongst. As this goes on year after year it is not difficult to understand how a hardpan is formed even in a tea garden which is considered under fair cultivation. It is not so very many years ago when many planters believed that cultivation in any form, and more especially deep cultivation, during the cold weather was waste of money and labour. Now-a-days it is very noticeable that our very best gardens are those who go in for deep cold weather cultivation, and this has so fully been recognised as a necessity in up-to-date cultivation of tea that what is known as trench hoeing has been resorted to, and it is, all done with the object of breaking up the impervious layer of sub-soil to which we have given the name of "hardpan." Of course the ultimate object is to allow the roots of the tea bush as large a quantity of permeable soil after aeration, of supplying a larger amount of mineral food in an available condition. A bush having a large root range will not suffer so much in its quality. In the leaf product, represented by the manufactured article. when bulky nitrogenous manures are supplied, as one having a limited rooting volume of soil, the advantages of breaking up the hardpan and bringing the sub-soil into cultivation are so numerous and so generally understood by planters that it is unnecessary to recapitulate them and we will now proceed to describe the dynamite demonstration which took place for the purpose of showing how the roots of the tea bush can be allowed greater feeding space by the blasting of the hardpan.

THE DEMONSTRATION.

The demonstration took place amongst young tea in a clearance about two miles to the north of Sathgao factory. The main experiment took place in this cultivation, but dynamite charges were also tried upon uncultivated fallow land, and the effects of the explosive were also shown in uprooting trees, etc. As the primary interest was in that part relating to the cultivation of tea land, the other secondary part need not be described, as it was merely undertaken to illustrate the power of the explosive under different conditions. Several sizes of charges were used, but in the cultivation 25 charges weighing two ounces each were inserted in drilled holes 2½ feet deep. All the operations were clearly explained by the expert as they were performed. The cutting the fuse and the fastening on of the detonator were all shown and explained as the work was done. What to do and how to do it, what not to do and how to avoid all danger were equally as pointedly explained. No more people were supposed to be at the blasting operations than were absolutely necessary. Above all the detonators and cartridges must always be kept under lock and key. Children must not be allowed to take a detonator into their hands and they were very apt to get hold of them if they had the opportunity and their curiosity prompted them to find out what was inside. If the composition inside a detonating cap was pricked out the cap was certain to explode and the exploding of one of these caps had a force itself, entirely without the dynamite, sufficiently strong to shatter a man's hand to pieces, perhaps even worse might happen.

THE "MODUS OPERANDI."

When the holes were being loaded only a wooden rod for tampIng had to be used, and it was explained that pounding or striking the charge whilst ramming home must be avoided, "it had only to be gently pushed down to the bottom of the hole. Rather use too long a fuse than a too short one, so as to give plenty of time to get to a safe distance before the explosion. If a shot missed fire, and when this was absolutely certain, the shot must not be untamped. Another hole must be bored a distance of not less than 12 inches away. The detonators must be made watertight when firing in wet holes.

The special kind of dynamite used is known as Nobels Palarite, Gelignite of Farmers' Dynamite. Holes were drilled 2½ feet deep at a distance of twelve feet apart and when all was ready for touching off a planter each took charge of a row. They commenced lighting the fuses from one end and they had all finished at the other in plenty of time to allow of them getting to a safe distance before the explosions took place. Any one standing at a distance of twenty yards was perfectly safe. When the charges went off there was merely a heavy muffled thud which could be very perceptibly felt underneath at a distance of twenty yards. The ground in the vicinity of the explosion heaved up and when the place was examined it was found that the shattered fragments of sub-soil had been forced up through the surface soil. When the spot was dug up the sub-soil showed numerous cracks in all directions and no doubt that the force of the explosion had opened up numerous channels for the free entrance of air and rain water.

THE DISCUSSION.

There was considerable discussion amongst those present but the general trend was towards its not being able to compete with manual labour as it exists in the tea districts. The cost per acre works about Rs.75 when the shots are inserted at distances of 12 feet apart. If the shots were effective at 18 feet apart it, of course, would reduce the expense considerably. It would require further practical experiment by the planters themselves to find out when, where and how the explosives could be advantageously used. After the demonstration the company adjourned to the Sathgao bungalow for tea where the discussion was further continued.—*Englishman*, 3-2-13.

CARDAMOMS.

After some years of depression, we learn with pleasure that the price of cardamoms this year has gone up, so we take from Messrs. Schimmel and Co.'s semi Annual Report the following :—

The Cardamoms of British Commerce are all derived from *Elettaria Cardamomum*, Maton, N. O. Zingiberaceae which grows wild and is cultivated on the Malabar Cost and Ceylon. There is a large market for the spice in Calcutta; the annual consumption in India and Burma is computed to be nearly 1,000,000 lbs. Formerly scarcely any other than Malabar Cardamoms were imported into Britain but the Mysore variety now affords most of the fine quality. The latter plant possesses a more robust habit and bears exposure better than the Malabar type. It is not known how the district name " Mysore " came to designate the variety of a cardamom plant. There appears to be two varieties of Malabar plants, var. *minus* being confined to Southern India and var. *majus* growing in Ceylon. The latter is distinguished by its shorter stems, broader leaves and more globose fruit. In the shady mountain forests of Canara, Cochin and Travancore the cardamom plant grows between the altitudes of 2,500 and 5,000 feet. The plant is best suited to a rich, moist, loamy soil protected from strong winds. These conditions are met with in the betel-nut and pepper gardens of Mysore and of Canara and also in the cultivated cardamon valleys of Ceylon.

In the forest district of Coorg (Mysore) the cardamoms gardens are laid out in February or March, simply by making clearings in the forest, a space of some 20 to 30 yards of jungle being left between the gardens. Superstition plays an important part, felling of the trees being only permissible on certain days of the week and before noon. The natives also believe that the presence of such plants as ebony, nutmeg and pepper favourably affect the development of the cardamom plants. In the fifth year a full crop is produced. After seven years more, the plant becomes sickly. Some of the large trees in the jungle-screen surrounding the fields are felled ; the falling trunks kill many of the cardamom stems, thus stimulating the rhizomes to produce new shoots, thereby renewing the producing capacity of the plot another eight years, when the process of renovation is repeated.

In Ceylon the cultivation is carried out much more systematically. The favourite cardamom districts are Matale. Medamahanwara and Hewahata. The undergrowth of the land intended for a cardamom plantation is cleared, holes are dug 1½ to 2 feet wide, 12 inches to 15 inches deep and 7 feet apart in rows at a similar distance. The bulbs must not be planted too deep or they will rot. The use of seedlings instead of bulbs is increasing, however, the Mysore variety being most frequently grown from seed. Curiously enough only a small proportion of the seed germinates.

In Ceylon the plants flower almost all the year round ; picking being at the end of August and continues until April. The fruit is carefully dried by exposure to the sun or in wet weather by artificial heat. Machines for removing the calyx tube and the stalk have been introduced, and after passing through these the capsules are guarded and treated with sulphur vapour.

A table given at the end of the article shows that the cultivation of cardamoms in Ceylon has been steadily increasing. In 1911 the area and export were 7,300 acres and 564,819 lbs. In 1910, they were 7,426 acres and 639,007 lbs.

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(INCORPORATED.)

Contents.

The Entomologist to the Government of Madras, concludes his very interesting report with a description of the methods by which he hopes to arrive at a solution of the question of the pollination of coffee. Very minute details are given of the means to ensure success, and we are sure his efforts will be whole heartedly supported by those who are selected to assist him in this very interesting experiment. The whole planting community will await the outcome and the final report with hopeful anxiety, and wish it all success. It may have far reaching results.

Many travellers in India have said that they considered Coorg the prettiest part of India and when it becomes more accessible, when the Railway runs through the country, will be more frequently visited by those in search of the picturesque. That rubber is becoming a very paying industry will delight those who have seen this small country—at one time almost entirely dependent on its coffee industry.

With agriculture (to be successful now-a-days) so dependent on the aid of science, Universities and Colleges are turning out Scientists to help the agriculturists are everywhere advocated, and we reproduce an article from *Nature* dealing with this important subject.

The Government Entomologist of Ceylon in his report describes some of the pests to which rubber is subject, which if not nipped in the bud may cause great damage and loss to the planter. This is another case in which the Scientist is so necessary to differentiate between the harmless and harmful beetle.

Messrs. Stenning, Inskipp & Co.'s circular is published as it contains much useful information to the Tea planter. To Coffee planters the French Parliamentary Report should prove interesting, dealing as it does with the valorized coffee and attention is specially drawn to the para. on " Free admission of Colonial (French) Coffee", and it will be noted that the French Colonial Coffee is protected highly against foreign grown coffee.

BEES AND THE FERTILISATION OF COFFEE.

[*Concluded.*]

THE EXPERIMENTS PROPOSED TO BE DONE.

" The experiments proposed to be done are shown in a Tabular Form in an Appendix.

" The Bags referred to will be made of two kinds of material, (A) Fine Muslin, and (B) Mosquito Netting, but all will be of the same size, 4 feet by 2 feet, rectangular in shape.

"These Bags are intended to be tied around selected branches of Coffee-bushes for the various periods shown under the different experiments, to prevent pollination by particular insects at the different times quoted.

The experiments intended to be tried are:—

I. The bag to be applied before the buds open and kept applied during the whole flowering season, thus acting as a check on Pollination by (A) all insects and wind, and (B) all except minute insects.

II. The bag to be applied daily from dawn to dusk throughout the flowering season, the bag being removed and the flowers left exposed from dusk to dawn. This will act as a check on pollination by all day-flying insects (A and B).

III. The bag to be applied daily from dusk to dawn throughout the flowering season, the bag being removed and the flowers left exposed from dawn to dusk, thus checking pollination by crepuscular and nocturnal insects. (A and B).

This experiment is the opposite of II.

(The letters (A) and (B) refer to experiments with Muslin and Mosquito-net Bags respectively.)

IV. The bag to be applied daily from 7 a.m. to 5 p.m. throughout the flowering season, the bag being removed and the flowers left exposed from 5 p.m. to 7 a.m., thus checking pollination by Honey-bees chiefly (A and B.)

V. The bag to be applied daily from 8 a.m. to 4 p.m. throughout the flowering season, the bag being removed and the flowers left exposed from 4 p.m. to 8 a.m., thus checking pollination by all insects flying in the hot sun (*e.g.*, mostly butterflies, syrphids, etc.) (A and B.)

VI. The bag to be applied daily from 4 p.m. to 10 p.m. throughout the flowering season, the bag being removed and the flowers left exposed from 10 p.m. to 4 a.m., thus checking pollination by crepuscular insects (chiefly, Sphingids.) (A and B.)

VII. The bag to be applied daily from 8 p.m. to dawn throughout the flowering season, the bag being removed from dawn to 8 p.m., thus checking pollination by all nocturnal insects. (A and B.)

Note.—It would have been better to have applied these bags from 8 p.m. to 4 a.m., but it would probably be difficult to get this done at 4 a.m. As a matter of fact, there seem to be very few insects about in the Hills between 4 a.m. and dawn.

VIII. Bag to be applied during the whole time that the flowers are out. The flowers of the enclosed branch to be pollinated by hand with pollen from flowers on this same branch.

IX Bag to be applied during the whole time that the flowers are out. The flowers of the enclosed branch to be pollinated by hand with pollen from a different bush.

Note.—In Experiment VIII the flowers will probably be best pollinated by taking and applying the pollen on a camel-hair brush, which should be carefully sterilized beforehand by immersion in spirit.

In Experiment IX the flowers may be pollinated with a brush (as in VIII) or by shaking pollen from a branch taken from another bush. In the latter case, care must be taken that no insects are shaken on to the branch which is to be bagged.

In Experiments VIII and IX only Muslin bags will be used as the idea is to exclude pollen carried by wind. For this reason care should be taken as far as possible to pollinate by hand when the air is calm; the early morning would probably be the most suitable time if pollen is available then.

Care will have to be taken as far as possible that all branches bagged are free from insects at the time the bags are applied. Care must also be taken that the bags themselves are empty of insects when applied to the branches.

I have no information regarding any special time or stage at which the pollen grains are liberated. Possibly some of the planting community may be able to tell us about this; otherwise it will require observation to find out the proper time to pollinate by hand in Experiments VIII and IX. Some plants only liberate their pollen-grains within very circumscribed limits of time; *e. g.*, between 4 and 7 a. m. in the case of *Hibiscus*. The times may also vary according to local conditions.

CONTROLS.

For a proper estimation of the results of the experiments, it is essential to have controls, *i. e.*, branches exposed to exactly similar conditions except for the bagging. For each experiment, therefore, *two* similar bushes should be chosen beforehand, each having branches similar to one another as regards size, situation (exposure to sun and wind), and promise of flower; one of each of these branches will be bagged for the experiment, the other left untouched and treated as the control of the first.

LABELLING.

For accurate identification, at the time and afterwards, of the branches, both of those under experiment and of those used as Controls, it is essential that they be plainly labelled. It must be remembered that the actual results of the experiments cannot be ascertained until some months afterwards when the berries are full-grown. For labels I would recommend slips of smooth wood, fastened by wire on to the branches to which they relate. If the details are boldly written on both sides of the labels in pencil, they should remain legible throughout the monsoon. Wood slips about 4 inches by 2 inches, planed smooth on both sides, would be of suitable size. Thirty-two of these will be required for each set of experiments; sixty-four for each District.

As these can easily be made locally I would suggest that the Secretaries of the Planters' Associations concerned should have them ready beforehand (by 15th March), with the necessary wire for affixing.

The same number of bushes will also have to be selected in readiness beforehand and I would suggest that the Secretaries or experimenters should have this done also by the same date.

OBSERVATIONS OF INSECTS VISITING COFFEE-FLOWERS.

The experiments may usefully be supplemented by direct observation of the insects actually visiting the coffee-bushes whilst these are in bloom.

I propose, that in each district, a representative collection of these insects shall be made and as, for this to be done properly, continuous observation and collection from early morning until after dusk will be necessary, this work will take up one man's whole time. For this therefore, I propose to send a member of my Staff to each District; but if this is done, arrangements will have to be made for their accommodation. They would, of course provide for their own food. The men I have available are two Assistants and two Fieldmen. The Assistants are Brahmins and University Graduates; the Fieldmen are both Native Christians. I shall be glad to know whether districts have any particular preference for either class of man.

Should I myself be free to visit Coorg (as proposed above) I shall propose to give my time chiefly to observation-work of this kind; as a supplementary worker."

SUMMARY OF EXPERIMENTS.

Serial No.	Bags applied to selected Coffee-bushes.	Series A (Muslin Bags.)	Series B (Mosquito-net Bags.)	Object of Bagging.
I.	Whole time that Flower is out ...	1	1	Check for pollination by all insects.
II.	Dawn to dusk ...	1	1	Check for pollination by all day-flying insects.
III.	Dusk to dawn ...	1	1	Check for pollination by crepuscular and nocturnal insects.
IV.	7 a. m. to 5 p. m. ...	1	1	Check for pollination by Bees chiefly.
V.	8 a. m. to 4 p. m. ...	1	1	Check for pollination by all insects flying in hot sun (*e.g.*, mostly butterflies, Syrphids, etc.)
VI.	4 p. m. to 8 p. m. ...	1	1	Check for pollination by all crepuscular insects.
VII.	8 p. m. to dawn ...	1	1	Check for pollination by all nocturnal insects.
VIII.	Whole time that Flower is out ...	1	...	Self-pollinated by hand with pollen from some bush or branch that is enclosed in this one bag.
IX.	Whole time that Flower is out ...	1	1	Cross-pollinated by hand with pollen from a different bush.

Series A is especially to prevent pollination by all insects and wind.

Series B is especially to prevent pollination by all large insects, (e.g., Honey-bees.)

COORG

The Report on the Administration of Coorg for 1911-12 has recently come to hand and the following facts and figures are gleaned from its pages in the hope that they may prove of interest to those who only know this delightful District from hearsay and as a member, through its Planters' Association, of the U. P. A. S. I.

Everything about Coorg is interesting from its stirring history of wars and its final offensive and defensive alliance with the British which ended in the overthrow and death of Tippu in 1799, to its inhabitants, the Coorgs, in their picturesque dress, and its beautiful mountain scenery. It is a small district being only 1,583 square miles with a total length from north to south of 60 miles and from east to west of 40 miles. On the North and East for a little way the Cauvery and Hemavati rivers form the boundary with Mysore, but elsewhere it merges gradually into the Mysore tableland, while on the South a range of hills forms the boundary with Wynaad. To quote the Report, "viewed from an eminence the whole of the southern portion of the country presents the appearance of one great forest. In the extreme south-eastern portion of this forest tract there is a long stretch of jungle which is deciduous in character and contains valuable teak and *honne* timber trees; further inland the foliage changes to evergreen, largely intermixed with bamboo. It is the prevalence of the latter which has given the appellation of 'The Bamboo' to the valuable tract of land, thirteen miles square, now forming in South Coorg a continuous succession of coffee estates. From Fraserpet to the west the country rises rapidly to the Mercara plateau fifteen miles away, just below which lies the large group of estates which form the Santikoppa coffee district."

"There are two main outlets to the western coast. The high roads to the ports of Mangalore and Tellicherry run through these passes, which about forty years ago were covered with dense forest. This gave place to coffee which succeeded for a few years and then failed, the rain-fall being so heavy that it washed away the soil no longer protected by the forest;" the process being aided by methods of clean weeding and scraping the soil it might have been added. "Lantana, a shrub introduced in 1863, has now taken the place of coffee and has overgrown the sides of these hills turning them into an almost impenetrable bush.

Altogether there are 43,313 acres of coffee and some of it is probably the finest Coffee in Southern India. During 1911-12, 4,500 tons of coffee were exported.

Mercara is the capital of Coorg, an historic town perched on the top of the hills at an elevation of 3,809 feet with an average maximum temperature of 80'6 and an average annual rainfall of 107 inches.

Coorg is famed for its Oranges, and there are 1,689 acres under this cultivation. Other crops are Cardamoms 1,972 acres, Agave 142 acres, and 4,958 acres of Rubber, chiefly Ceará which is rapidly becoming a very paying industry in this District,

The total population at the 1911 Census was 179,976, of whom 33,886 are Coorgs. This population is almost entirely dependent upon agriculture for a living. The Report states that "there are no recruiting stations in Coorg and no record is kept of emigration and immigration."

R. D. A.

CORRESPONDENCE.

THE EDITOR,
Planters' Chronicle,

Dear Sir,—I have read with considerable interest your articles on high explosives as an aid to agriculture.

I have recently come over from Australia after spending 11 years there and can fully endorse all that is said in their favour. I have seen sour clayey country which was considered useless broken up by Gelignite or Rack-a-rock, and next season it grew the best crop in the paddock. I have also seen a country with a good, but shallow surface soil, and a hard pan underneath, broken up and excellent lucerne grown on it, which as you doubtless know is a very deep rooted plant.

Regarding shooting stumps, this is largely governed, by the class of timber. If it is good sound close grained wood and the smaller roots cut about 6 ft. away all round the stump, a shot well tamped in the tap root will nearly always bring it down, but soft wood will generally shatter just round the shot hole and nothing much else happens.

A way I found very successful for getting rid of stumps was to bore with 1" or 1¼" auger a hole downwards diagonally in the stump about 6 inches from the ground and as deep as you can, then fill this hole tight with *saltpetre*. (This is very cheap compared with Explosives) and either cork it or hammer a well fitting piece of wood into it, there leave it till the following dry weather, put a little rubbish round the stump, and it will quickly light and will smoulder for weeks and in the end it will be completely burnt out, roots and all.

Of course, I speak of Australia where the rainfall is, say 22 inches. How your monsoon would effect it I don't know, but I think it would work right through just the same. It is a great mistake to try and help the fire by clearing away earth as it burns, but leave it entirely alone, or you will probably spoil the draught.

In shooting to break up sub-soil, I have always found that for the best results the ground wants to be wet, when it is dry a good deal of the force of the explosion is lost by the openness of the soil. If the cap is well soaped round the fuse, water is the best tamping I know. The relative value of gases given off by Gelignite or Rack-a-rock I don't know, but of the two, I consider, after considerable use of both, that the latter has rather a greater smashing effect.

Yours faithfully,
(Signed) COLIN HINDLEY.

REDUCTION OF SAO PAULO COFFEE LOAN.

It will interest coffee planters to read the following and to know that the valorized coffee has been diminished by 50%.

According to a telegram from Sao Paulo, the Minister of France a short time ago asked the Government of Sao Paulo to furnish him certain information regarding the varlorization loan. As a result, the Secretary of Finance has informed the Federal Treasury that the £15.000,000 ($73.000,000) loan is now reduced to £5,417,087 ($26,500,000).—*Simmons' Spice Mill.*

A UNIVERSITY IN THE TROPICS.

The *Times* of January 23 devotes one of its leading articles to the important question of the need of establishing a university in the tropics for the study of tropical agriculture. The subject is dealt with in a very interesting and forcible manner and it is to be hoped that it may not be long before the proposal is realised.

At present, beyond the few facilities which exist at the Imperial College of Science and Technology there is no place within the British Dominions where men who aspire to a tropical post or have to deal with tropical estates, can learn more than a smattering of either the nature or magnitude of the problems which await solution. Yet men are constantly being sent out as agricultural officers to fill highly important and responsible posts, and they are expected to be able at once to cope with the difficulties which are presented from all sides.

Did we but stop to count the cost of our want of foresight in this matter, we should realise that the expenditure in establishing a proper training centre in the tropics would long ago have been repaid by the increase of efficiency in the officers, and the resultant improvement in agricultural operations.

The paramount advantage of a university or college of science established in some tropical colony would be that it would provide a centre where questions relating to soil, plant and animal breeding, plant and animal pathology, economic zoology and various chemical and other questions could be investigated under tropical conditions by a highly competent professional body, and where advanced instructions could be given to students—whose preliminary training had been received elsewere—destined to fill agricultural posts in one or other of our tropical colonies. If the need of such an institution be admitted the question then arises. Where should such a university be stationed? Before suggesting an answer to this question, it is necessary to point out that in view of the two-fold nature of the proposed institution three points must be kept in mind. In the first place, it should be situated in a colony offering the greatest possible scope for diverse agricultural pursuits; secondly the healthiness of the colony should, so far as possible, be beyond reproach. and thirdly, the spot chosen for the university should be within easy access of the British Isles.

This last point is perhaps the most important one of all, since not only is it desirable on behalf of the students from home that the expenditure of time and money should not be unduly large, but also it is of paramount importance that the professors and lecturers should be able to have the opportunity of frequent intercource with home, and so reduce to a minimum the possibility of stagnation and loss of vigour which might be liable to occur if personal intercourse with fellow-workers at home were rendered difficult by distance and expense.

This danger of stagnation would also tend very effectively to be obviated if the tropical university or college of science could be definitely linked with an institution at home. Such an institution should be either a university especially interested in agricultural matters or an institution of university standing, such as the Imperial College of Science and Technology.

If then it be agreed that the points which have been urged in considering the requirements of an agricultural institution in the tropics, must be regarded as conditions essential to its success, it would seem clear that the site for the institution must be sought in the Antilles. Nowhere among these islands do we find all the requisite conditions so fully met as in the easily accessible and beautiful island of Trinidad.—*Nature*.

TEA.

We publish Messrs. Stenning Inskipp and Co.'s Circular on the subject of Firing, Packing and weighing tea, believing that much useful information is contained in a small compass. As regards marks on chests, we differ and are of opinion that the words " Pure Indian Tea" should be stencilled on to the chests as advised in our issue of February 1st, page 55.

At the commencement of the New Season, we would again draw attention to the following notes on :

FIRING, PACKING, AND WEIGHING TEA.

Firing.—As freshness of smell in the leaf and briskness in the liquors are so essential. we cannot too strongly urge that the greatest care should be given to this process both in the initial and final stages. The leafy kinds as well as the brokens should be thoroughly dried, at the same time leaving strength and flavour unimpaired by anything like scorching.

Packages should be made of well seasoned wood, with strong triangular battens in the angles nailed to the package with nails of sufficient length to enable them to be clenched ; this greatly strengthens the package and will be a preventative against loss of tea in transit. A lining of *good stout tea lead* is necessary.

When a thin lining of lead is used, parchment paper should be added as a further protection, and all battens should be covered to prevent their direct contact with the tea. It is also recommended that small broken fannings and dust be packed in half-chests.

N. B.—In the case of Dusts weighing over 110 lbs. nett and of Fannings over 120 lb. nett. nothing is recoverable from the Shipbrokers for loss in weight in transit.

As freight is charged on the measurement and not on the weight, and buyers refuse all slack packs except at a reduction in price, it is important to well fill all packages, the tea being closely filled in but not crushed.

Factory Bulked Teas.—In the case of garden bulked teas, care should be taken that the empty packages of any break should not vary more than 2lbs. in weight. If the variation is more than this all the packages are turned out for the purpose of taking actual tares. Great attention should be paid to the packing as (even after the most careful bulking) irregularity in the appearance of the leaf due to this having been unevenly done may necessitate rebulking in London.

Marks on Chests.—Nothing is wanted nor is of any service here beyond (1st) Garden Mark (2nd) Description of Tea (3rd) Garden Numbers. Gross, Tare and Nett are not of the least use, and should be discontinued.

WEIGHING.

Gross.—Under the present regulations, in taking the gross weight of packages exceeding 28lbs. the Customs deduct all ounces over the even pound. Thus gross weights of 127 lbs. up to 127 lbs. 15 oz. are taken as 127 lbs.

Tare.—In weighing the empty package for tare, fractions of less than half a pound are ignored, but a half pound or over is taken as a full pound, thus a tare of 28 lbs. 7 oz. is taken as 28 lbs., one of 28 lbs. 8 oz. or over as 29 lbs.

Nett.—The nett contents of the chest are never weighed but are arrived at thus:—

	lbs.	oz.		lbs.
Actual gross weight of	127	6	gives a Custom weight of	127
„ tare „ „	27	5	„ „	27
Giving a nett of	100	1	or „	100

The Gross weight should in all cases amount to a few ounces over the even pound to guard against loss in transit. If the gross were weighed to the even pound in the factory and there were a loss on the voyage of only one ounce, this would mean a loss of one pound in London. Thus a factory gross of 127 lbs. losing one ounce in transit, would give an actual weight in London of 126 lbs. 15 oz. and be taken by the Customs as 126 lbs.

The tare (that is the weight of the empty package including lid, lead, nails and hoop iron) should weigh a few ounces below the half pound.

The following are instances of how teas should turn out in London so as to avoid heavy loss:—

	lbs.	oz.		lbs.	
Gross ...	127	4	Customs weight	127	
Tare ...	27	4	„ „	27	
Nett ...	100	0		100	Loss 1 lb. that is draft only.
Or.					
Gross ...	127	5	Customs weight	127	
Tare ...	127	3	„ „	27	
	100	2		100	Loss including draft, 1 lb. 2 oz.

And not in the following manner where the loss would be heavy:—

	lbs.	oz.		lbs.	
Gross ...	127	13	Customs weight	127	
Tare ...	27	9	„ „	28	
Nett ...	100	4	„	99	Loss including draft, 2 lbs. 4. oz.
Or again					
Gross ...	127	15	Customs weight	127	
Tare ...	27	8	„ „	28	
Nett ...	100	7		99	Loss including draft, 2 lbs. 7 oz.

Draft.—1 lb. per package on all packages grossing 29 lbs. and upwards is allowed to the buyer.

Dock and Warehouse Management Rates, on packages of which the average gross of each break is as under, are:—

160/199 lbs.	130/159 lbs.	90/129 lbs.	80/89 lbs.	60/79 lbs.
2/2	1/10	1/6	1/4	1/2

45/59 lbs.	35/44 lbs.	17/34 lbs.
—/11	—/10	—/6

STENNING, INSKIPP, & CO.,
14, Mincing Lane, E. C.

COFFEE.

French Parliamentary Report on Coffee.

(FROM CONSUL JOHN BALL OSBURNE, HAVRE.)

The Committee on Customs of the French Chamber of Deputies made a report to that body recently in regard to the proposal made by a deputy that rigorous measures be taken against the holders in France of the stock of Valorized coffee, with a view to prevent the further rise in coffee prices. This report takes up two questions: (1) Does the Valorization plan constitute a monopoly calling for severe measures? (2) Is it expedient to admit into France free of import duty all coffee produced in French Colonies?

In the light of contradictory advices that it has received, the Committee hesitates to give an opinion, but inclines to the view that the principal reason for the prevailing high prices is not the valorization, but rather the increase in consumption, accompanied by small crops and the establishment in Brazil of warehouses where the planters can warrant their crops while awaiting the favourable moment for sale. But even assuming that the valorization has exerted the decisive influence on prices that is claimed the Committee does not think that this fact proves that it is a monopoly.

VIEWS OF COMMITTEE ON VALORIZATION.

The Committee refers to the view expressed by the Chamber of Commerce of Havre that it is to the general interest that the Government of Sao Paulo keep strictly to the engagements that it has made. On this point the Havre Chamber has declared as follows:—

"It is not only desirable, but necessary, that our commerce should know in advance the conditions on which it may count. The element of chance involved in crop prospects is in itself sufficient to up-set the best founded predictions without adding the uncertainty as to the qualities of coffee that the Government of Sao Paulo might put on the market at any moment."

It was suggested to the Committee that the regulations concerning merchandise remaining in bonded warehouse for more than three years be applied to valorized coffee. This refers to the law which requires the withdrawal of merchandise from bonded warehouses at the expiration of three years. This period, however, may be prolonged at the discretion of the customs authorities and it is understood that applications for its extension are invariably granted. In this connection the director of the principal bonded warehouse at Havre states that coffee not infrequently remains in bond as long as six or seven years.

PROTEST AGAINST THREE-YEAR REGULATIONS.

The Committee believes that the strict application to the three-year regulation would be a very objectionable procedure. In fact, the Chamber of Commerce of Havre has filed a protest against this proposal, since the 1,500,000 bags of valorized coffee stored at Havre would necessarily be shipped elsewhere involving a great loss to this community. The Committee concludes its report on this question as follows:—

"The study of valorization shows that we do not possess any effective weapon against the International Committee and that we have practically no means to compel it to throw on the market more coffee than it has decided to put on sale. It is the duty of the Government only to employ whatever influence it possesses with the French Members of the group to endeavour to obtain an earlier liquidation of the stock as well as increased allotments for our markets. France has taken this year nearly one-fifth of the stock delivered for consumption, namely 226.000 bags sold at Havre and 20,000 at Marseille out of a total sale of 1,200,000 bags.'

FREE ADMISSION OF COLONIAL COFFEE.

The proposal to admit French Colonial coffee free of all import duty is perhaps the most important feature of the Committee's report. The present duty on the colonial product is only 58 francs per 100 kilos (5 cents per pound) while coffee imported from Brazil, Porto Rico and elsewhere is obliged to pay a regular minimum duty of 136 francs per 100 kilos (11·9 cents. per pound).

The Committee believes it quite impossible to take other measures than those suggested against the holders of valorised coffee in order to arrest the upward trend of prices, and it believes that the proposed free entry of French Colonies coffee would emancipate little by little, at least in part, the French market from dependence on countries which like Brazil have a sort of monopoly of production. The Committee further recognises that the problem is a difficult one since continental France can obtain from her colonies scarcely more than 2 per cent. of the quantities of coffee required for domestic consumption. The Committee does not believe there would be any immediate result seen in modification of present high prices, but it expresses the hope that the culture of coffee, if rendered more remunerative for the French Colonies will develop in such a way, that their markets increasing from year to year, will finally make themselves felt in prices and prevent the exaggerated rise in a commodity of prime necessity.

The Committee expresses the opinion that the present duty is not sufficiently low to permit the colonies to compete successfully with Brazil but that complete exemption from duty would give them a new advantage susceptible of assuring renewed economic vitality to the colonies of the first group.—*Simmons' Spice Mill.*

ESTIMATED BRAZIL PRODUCTION OF COFFEE THIS SEASON.

A Cablegram dated December 28, 1912, from the International Institute of Agriculture, Rome, Italy, received by the United States Department of Agriculture, stated:—

"In Brazil, the estimated production of Coffee this season is 1,322,720,000 lbs."—*Simmons Spice Mill.*

RHODESIAN RESTRICTION ON POTATOS.

We learn from the *South African Agricultural Journal* that the Southern Rhodesia Government, by a regulation dated October 3, 1912, prohibits the importation of Potatos from other parts of South Africa or from over-sea, if found on inspection to be infested with the pest known as "root gall worm" (Heterodera radicicola.) Infested tubers will be refused admittance to Southern Rhodesia or destroyed. The root gall worm, sometimes called Potato eel worm occurs commonly in Potatos grown in most parts of the Union, and shippers of Potatos to Southern Rhodesia will need to exercise great care not to have infested tubers included in their consignments. The presence of infestation is generally indicated by nodular swellings about the size of split Peas, on the surface of the tuber, and on removing a thick peel from such tubers watery-looking spots, about the size of a pin head, are to be seen under the swellings.—(The *Gardeners' Chronicle*, January 18, 1912.)

RUBBER.

Rubber Pests.

The following account of Rubber Pests in Ceylon is taken from the report of the *Government Entomologist, Ceylon* :—

The large root-borer of Hevea, described and figures in the "Tropical Agriculturist" of September 1910, p. 221, appears to be growing more common in the Kelani Valley districts. Complaints of damage by this borer have come in from Avissawella, Padukka, Waga and Undugoda. One correspondent reports that a group of half-a dozen old trees has been killed by this pest. Six or seven of the grubs have been found in a single tree. The borer is a large whitish, fleshy, grub, more or less cylindrical in form, but, with the segments immediately behind the head, much broader than the others. It is the larvæ of a Longicorn beetle, but of which particular species it is impossible to say at present. Apart from the fact that most of the specimens that have reached me have been damaged in the process of extraction, it is always difficult to rear up boring larvæ when removed from their natural conditions. I have, however, planted one or two Hevea stumps (believed to contain borers) in a cage, and hope that the adult beetle may eventually appear. From the size of the grub the beetle is probably a large one, and should be a conspicuous object when resting on the stem of the tree. Meanwhile, it will be advisable for rubber planters to regard all larger Longicorn beetles with suspicion, and destroy them when found "loitering" in their rubber clearings.

The "Rubber Slug" (*Mariaella dussumierii*), which was the subject of one of the R. B. G. Circulars last year, has again been reported this time from the Udagama district, where it is said to frequent the tapping wounds and to attack the shoots of young plants. The habit of imbibing latex does not appear to be confined to this single species, as I have received specimens of a small black slug of a distinct (but undetermined) species that was "found drinking the latex on freshly-tapped rubber trees" on an estate near Talawakele.

I continue to receive specimens of Scolytid beetles (allied to the "shot-hole borer" of tea) extracted from the stems of Hevea trees, and believed (by the senders) to be responsible for injury to the trees. I still believe this to be a misconception of the conditions. In every case that I have examined there have been unmistakable indications of earlier fungal disease. When the bark has been attacked by canker or any other fungus that kills the tissues, it becomes attractive to these small boring beetles which are unable to penetrate healthly laticiferous bark. What lends colour to the idea that the borers can make their way into healthy rubber bark is the fact that latex is sometimes found to be exuding from the perforation. This may be explained in several ways. Sometimes the outer layers only of the bark have been killed by the fungus. Borers will attack these spots and will attempt to drive their galleries into the deeper and as yet unaffected tissues, when they are repelled by the flow of latex. Or they may drive their tunnels too near the periphery of the diseased area and strike latex there. Another cause of bleeding may result from the separation of dead bark from the wood, leaving a cavity which often becomes filled with latex from surrounding healthy tissues. If this blister is pierced by the borers, the latex finds its way to the surface. The beetles may also penetrate bark that is temporarily devoid of latex, after which renewed activity may occur, accompanied by an exudation through the perforation. The principal species of "Shot-hole borers" that have been found in Hevea trees are *Xyleborus semiopacus*, *X. discolor*, *X. interjectus*, *X. perforans*, *Platypus solidus*, *Eccoptopterus sexspinosus*, and *Cryphalus plumierae*.—*The Ceylon Observer*.

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(INCORPORATED.)

Contents.

Mr. Anstead, Scientific Officer, left on tour on Saturday last for the High Range and will be away for at least a month. He will, if possible, continue his valuable series of papers. Before leaving he furnished us with an article on the Kalisyndikat Manurial Experiment explaining the suggested experiments to be undertaken. Details are very fully entered into.

It will be noticed that the Malabar Coast Planters' Association has changed its name to the West Coast Planters' Association.

A very interesting letter from Mr. Hindley is published which is of great value as being a personal experience in Australia and throws more light on the use of dynamite. His warnings as regards its use are most useful and should be taken to heart.

From the Malaya Planters' Association are published two letters about Labour. That from the Labour Association, Ltd., is suggestive.

Mr. Carmichael's letter is published as being of general interest and will be circulated to all District Associations by the Secretary.

We publish the views of Mr. Lyne, the newly appointed Director of Agriculture in Ceylon, on Dynamite in planting, and read in conjunction with previous articles printed in the *Chronicle*, confirms our own opinion that in the near future, explosives will be largely used throughout India by all agriculturists.

An extract is made from the Annual Report of the Ceylon Planters' Association and we hope next week to publish one or two of the more prominent speeches.

The Hon'ble Mr. Barber has kindly sent us two pamphlets about the European Defence Association containing the Rules and Objects of it, and we learn from him that a Branch will shortly be opened in Madras.

Scientific Officer's Papers.

CXVI.—KALISYNDIKAT MANURIAL EXPERIMENTS.

At the Annual Meeting of the U. P. A. S. I., in 1912 the offer of the Kalisyndikat of Berlin to give a subsidy of £100 per annum to each of the districts of Mysore and Coorg for the purpose of carrying out manurial experiments was accepted. (See Book of Proceedings 1912 p. 42).

The following Scheme of Experiments has been drawn up and different parts of it will be carried out on various estates in Mysore and Coorg commencing this year. These experiments are under the immediate control of the Scientific Assistants, while Mr. Birnie, the Syndicate's representative in India. has inspected the plots chosen and afforded valuable aid in the preliminary details. It is proposed to conduct these experiments over a continuous period of five years, and then to issue a report attempting to correlate the results obtained.

In this scheme it is taken for granted that the Coffee planters know that a complete fertiliser is necessary. It is therefore designed to test the comparative value of the different forms of Potash in combination with Phosphoric Acid and Nitrogen, and also the possible value of Nitrolim and Calcium Nitrate, Messrs. Stanes & Co,. of Coimbatore, having offered to supply the latter free for the purposes of these experiments.

EXPERIMENT I. COFFEE.

Series.	Serial letter.	Manure.		
1. Complete Fertiliser..	A	Poonac 2	Bone Meal 2	Muriate of Potash. 1
	B	Poonac 2	Bone Meal 2	Sulphate of Potash. 1
2. Nitrogen from Mulch	C	Basic Slag 2	Muriate of Potash. 1	
	D	Basic Slag 2	Sulphate of Potash. 1	
3. Saltpetre ...	E	Bones 3	Saltpetre. 1	
4. Complete Fertiliser..	F	Basig Slag 3	Sulphate of Potash 3	Nitrolim. 4
	G	Basic Slag 5	Sulphate of Potash 3	Calcium Nitrate, 4
	H	Bones 15	Muriate of Potash 8	Calcium Nitrate. 9 (+8 soil)
	I	Bones 15	Sulphate of Potash 8	Calcium Nitrate. 9 (+8 soil)

EXPERIMENT IV. CEARA RUBBER.

Serial letter.	Manure.	
J	Sulphate of Potash ...	½ lb. per tree. 1 lb. per tree.
K	Muriate of Potash ...	½ lb. per tree. 1 lb. per tree.
L	Saltpetre ...	½ lb. per tree. 1 lb. per tree.
M	Calcium Nitrate	½ lb. per tree. 1 lb. per tree.
N	Nitrolim ...	½ lb. per tree. 1 lb. per tree.

EXPERIMENT I.

In Series 1, a direct comparison between Sulphate and Muriate of Potash in a general fertiliser such as is usually used for Coffee is obtained, the proportions of the different ingredients in the mixture being based upon the ash analysis of the coffee plant and seed and assumed to be right for the time being.

In Series 2, it is assumed that where a heavy mulch of leaves exists there is Nitrogen enough (See *P. C.*, Vol. VII, pp. 238, 253 which contain an account of work done to investigate this point). This experiment is designed to test the accuracy of this theory in comparison with Series 1, and if it be correct, to discover whether the potash is most suitably supplied with Basic Slag in the form of Muriate or Sulphate. Series 3, contrasts saltpetre with Muriate and Sulphate of Potash in Series 1.

Series 4, is designed to test the value of Calcium Nitrate and Nitrolim respectively and to discover what form of potash is best used with these fertilisers.

With regard to the time of application I would suggest that in all cases in this experiment Poonac, Bone Meal and Basic Slag should be applied in March, and Potash, Nitrolim and Calcium Nitrate in the break of the South West Monsoon, September to November, though I should like time of application experimented with.

In Series 1, it would also be advisable to run a duplicate, Plots A, & B, receiving slaked lime at the rate of 2 tons per acre in March and the whole of the manure in the following autumn.

EXPERIMENT II.

This deals with the rate of application. In each of the series different quantities may be applied. The standard amount for application in Experiment 1, is about 4 cwts. per acre. In this Experiment, 4 cwts., 3 cwts., 2 cwts., and 1 cwt. can be used, so that each serial experiment (A, B, C, &c.. &c.,) may be divided into 4.

EXPERIMENT III.

This deals with time of application and in each series the manures may be divided and applied at different times of the year in all possible combinations. Take for example Series 1 A. The whole mixture may be applied in March or in September. Or Poouac and Bones in March and the Potash in September and so on.

Probably Experiments II and III will not be taken up and they will certainly not be carried out in all their possible combinations. Experiment I will however be done or sections of it will be done more rapidly by planters.

It is proposed to allow planters to choose which series they like. Some may do all, some one or more.

In all cases the following data should be recorded if possible :—

Essential data—

1. Number and letter of Plot.
2. Area of the Plot.
3. Number of trees.
4. Manure applied.
5. Date when manure is applied.

6. Cost of manuring.
7. Weight of crop picked before pulping.
8. Weight of dry parchment.
9. Rainfall of estate.
10. Nature of Soil and shade trees.
11. Nature of Mulch.
12. Remarks as to freedom from leaf disease, &c.

Further desirable data—

13. Weight of each grade of coffee, A. B. C. P. & T.
14. Quality of each grade.
15. Price obtained for each grade.

Analysis—if possible.

16. Soil analysis of each plot as a whole.
17. Analyses of all manures applied.

Another important factor to be taken into consideration is the relation of any manure, or mixture, applied to the *available estate labour*. Thus a Manurial system which required labour at times when it is always short, though it gave more crop, might be less economical than one which required labour at times when it is plentiful though it gave a smaller crop than the other.

EXPERIMENT IV.

This is proposed for Ceará Rubber and will be carried out probably only in Coorg there being little Rubber in Mysore. The idea is to test the value of a number of fertilizers in increasing the actual latex yield at the time of tapping in continuation of work reported in the *Planters' Chronicle*, Vol. VI, p. 203.

Purely manurial experiments can also be conducted with Rubber much on the lines of Experiment I if necessary.

RUDOLPH D. ANSTEAD,
Planting Expert.

THE LABOUR CODE 1912.

IMMIGRATION COMMITTEE'S RATE APPROVED.

The following notification is, by direction of the Chief Secretary to the F. M. S. Government, published for general information as a *Government Gazette* extraordinary:—

It is hereby notified that in exercise of the powers conferred by section 156 of "The Labour Code, 1912," the Indian Immigration Committee has, with the consent of the High Commissioner, prescribed the following rates to be paid for the first quarter of the year 1913:—

(1.) a rate of $2 to be paid by every employer in respect of every Indian labourer employed or working on the place of employment during the quarters.

(2.) A further rate of $1 to be paid by every employer who shall have employed during the quarter Indian labourers in excess of the number of adult Indian labourers imported by him with free passages provided by the Indian Immigration Committee during the twenty-four months proceeding the commencement of the quarter.—*Penang Gazette Weekly Mail Edition*,

DISTRICT PLANTERS' ASSOCIATIONS.

West Coast Planters' Association.

Late Malabar Coast Planters' Association.

Proceedings of an Annual General Meeting held at Malabar Club, Calicut, on the 25th January, 1913.

PRESENT.—Messrs. J. C. Christie, C. W. Clode, V. H. Travers-Drapes, Campbell Hunt, A. H. Mead, H. Waddington and H. C. Plowden, Honorary Secretary and Chairman. *Visitors*:—Messrs. B. M. Behr, C. E. M. Browne, J. G Ferguson, E. G. Pitcairn and W. O. Wright.

The Proceedings of the last Meeting were confirmed.

58. The Honorary Secretary read the Annual Report and presented the Accounts made up to 31st December 1912.

ANNUAL REPORT.

I have pleasure in submitting the Annual Report and Accounts for the year ending 31st December 1912 in accordance with the rule passed at the last Annual Meeting of the Association held at Trichur on the 6th April last.

Our late Chairman, Mr. Lord, having left the District, it falls upon me to submit both the Chairman's and Honorary Secretary's Reports, so I will combine the two in as short a space as possible and not take up more of your time than I can help.

At the last Annual Meeting it was resolved that there should be only two meetings of the Association yearly. One in Calicut and one in Trichur, and it was hoped these meetings would be well attended, but unfortunately we have been unable to obtain a well attended Meeting as yet. However, I am glad to see that there are more members here to-day as there is the important matter of reconstructing the Association to be discussed later on.

We were not called upon to increase our subscription to the United Planters' Association of Southern India during the current season.

The year under review has been a prosperous one for our main product, rubber prices having been satisfactory during the whole of the year, and if the prices realised at forward sales can be taken as a criterion 1913 should be equally prosperous.

Our thanks are due to the Public Works Department of Travancore and Malabar for the prompt way they have undertaken work brought to their notice by this Association.

The refund from the Rubber Exhibition Fund which amounted to Rs.332-8-2 has been placed to the General Fund of the Association

I much regret that the Scientific Officer has not been able to publish any bulletins, although we started the ball rolling with a subscription of Rs.30.

There are 10 Honorary Members, 10 Estates and 29 Private Members belonging to the Association. The cultivated acreage represented is still 11,481 acres and this year there should be an increase, but I am unable to give details as the subscriptions for 1913 have not yet been called for, as it was considered better to leave this over till after this meeting when the Association will have been reconstructed.

Referring to Accounts, a copy of this year's expenditure is on the table. You will see that there is a balance at credit of Rs.464-11-10 with the Bank of Madras. There are practically no outstanding liabilities and only Rs.35 due from Members.

I now beg to tender my resignation.

(Signed) H. C. PLOWDEN,
Honorary Secretary.

The Report was adopted and ordered to be printed with the Proceedings. The Accounts were passed subject to audit, Mr. Waddington being asked to audit same.

59. *Lady Ampthill's Nursing Institute.*—Resolved: "That the Association join this at once and the Honorary Secretary was authorised to pay the subscription of Rs.100."

60. *Reconstruction of Association.*—Resolved: "That the Rules as drafted and approved by this Meeting be adopted, printed and circulated to all members."

61. *Finance.*—Resolved: "That Subscription and acreage assessment for 1913 be settled by the Committee."

62. *Scientific Officer Fund.*—Resolved: "That the Association does not increase its subscription to this fund above the amount at present subscribed."

63. *Office Bearers.*—The following members were appointed:—

Chairman	...	Mr. Campbell Hunt.
Honorary Secretary	...	Mr. H. Waddington.
Committee	...	Messrs. A. H. Mead, T. Martin, and H. C. Plowden.

A cordial vote of thanks was passed to Mr. Plowden, retiring Honorary Secretary for his services during the past year.

A vote of thanks to the Chair and to the Honorary Secretary of the Malabar Club for loan of the Club Room for purpose of the Meeting terminated the proceedings.

(Signed) CAMPBELL HUNT,
(„) H. WADDINGTON,
Honorary Secretary.

Note by Honorary Secretary.—Change of title of the Association comes into force under first of new rules, which will be circulated to all members shortly, with statement of accounts to 31st December.

Writing of Tea Fluff as Manure for Roses *The Indian Planters' Gazette* says:—

"We may state that planters have also at hand another manure which likewise has a marvellous effect on rose plants, namely, the soot from their factory chimneys. Rose plants simply love it and thrive in an amazing manner under its influence. A mixture of tea fluff and soot would probably produce flowers which for size, colour, etc., would win prizes at any flower show. Hitherto tea fluff and soot have been thrown away as of no value, but now planters will know that both products are of the greatest value as manure for their flower gardens, especially for their rose plants."

CORRESPONDENCE.

The Editor,
Planters' Chronicle,

Dear Sir,—It is rather hard for me to estimate the cost; but I should say 3½—4*d.* a shot would about cover it, but this would depend upon the nature of the sub-soil treated and whether quite dry or wet, but the actual charge, distance and depth of shots per acre could only be found out exactly by practical experiment, but to get the fullest benefit of shots I think one ought to try and get each set to explode simultaneously; this can be easily done by timing, fuse is wonderfully accurate and will burn so many seconds to the foot with great regularity; by getting say 6 shots off together it seems to me a more general breaking up underneath will be made than by shots exploding one by one. Although the primary cost may seem a good deal, I feel certain it would be money well spent. One can't compare it to hand labour, for I know no white men who would attempt any area of any size; and coolies would die of old age from what I've seen of them before getting it finished.

I have never used it to replace hand labour, but to do work and prepare country which up till then hand or rather horse power had been *unable* to do (I am speaking of breaking up land, not trees or stone), thereby bringing country into profit which would otherwise be valueless; as far as I know the results are permanent; but whether the monsoon would solidify the subsoil again I don't know but I think the air and roots having once got in it would keep open.

But the only thing is for planters who think well of it to try it, I should say a fiver spent would give them a very fair idea. I would suggest you be sure and mention the saltpetre method of getting rid of stumps, it's very good.

SUGGESTED EXPERIMENTS

with Geliguite Dynamite or Rackarock.

6 shots ½ plugs	5th	square	2	ft. deep.
,, ,,	4th	,,	2¼	,,
6 shots whole plugs	10th	,,	2½	,,
,, ,,	12th	,,	3	,,
,, ,,	14th	,,	2	,,
[*]6 shots 2 plugs	18th	,,	3	,,
,, ,,	20th	,,	3¼	,,
,, ,,	24th	,,	2¾	,,

Try in various places, and vary depths according to distance of sub-soil from surface soil.

DON'T *Drop* dynamite etc. Be *particularly* careful of caps, they are the most dangerous, get *well* fitting fuse, shake all sawdust out of cap and push well home; don't *screw round* in cap, if fuse fits tight there is no need to crimp it, make hole in plug with *wooden* stick and push cap and fuse right in. Best way to light fuse split slightly at lighting end and put match head into it, then touch off with cigar.

COUNT your shots before going back, never dig out a misfire but put another close by and blow it out.

Yours faithfully,
(Signed) COLIN HINDLEY.

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[*] The heavier charges might be tried on unplanted land.

From,
C. D. J. Carmichael, Esq.,
Dy. Inspector-General of Police,
Southern Range, Coimbatore.
To,
The Secretary to the
United Planters' Association of Southern India,
Bangalore.

Sir,—Adverting to your letter dated 10th September 1912 on the subject of warrants issued under the Planters' Labour Act I have the honour to suggest, that if it can be so arranged, detailed descriptive marks of the maistries and coolies with whom contracts are entered into should be obtained and recorded in any admission or enlistment Register the Planters may maintain, and a copy of the entries be sent with the warrant for the arrest of the person concerned. Much of the difficulty now experienced in the execution of these warrants may by this means be obviated.

I have the honour to be,
Sir,
Your most obedient Servant,
(Signed) C. D. J. CARMICHAEL,
Dy. Inspector-General of Police, S. R.

Labour Code.

The Secretary, Malaya Planters' Association reads the following letter:

Sungei Mahang,
Mantin P. O.,
19th December, 1912.

Dear Sir.—"I forward the enclosed for your perusal.

"It seems to me that the Labour Association if they can fulfil their promises can only do so by an organized crimping at the coast, and it would appear advisable that the matter should be gone into.

"Another matter which I should be glad of your opinion on is the possibility or otherwise of proceeding against crimpers and harbourers over the Malacca boundary; I have suffered severely on Kubong Estate lately from bolters and now have heard indirectly that a Malacca crimp is sending them down there, receiving a bonus of 10/ per head.

"He, of course, is merely a tool; the people I want to get at are the receivers, and I should be glad if you would inform me whether in the event of my obtaining evidence I could proceed against the estate or estates for crimping and harbouring.

Yours faithfully,
(Signed) ORIENTAL RUBBER CO., LTD.
G. W. TEMPLER,
General Manager.

The SECRETARY,
Planters' Association of Malaya,
Kuala Lumpur.

4c De Souza Street,
Singapore,
12th December, 1912.

TAMIL COOLIES.

Dear Sir.—" We beg to advise that we have now made satisfactory arrangements for the prompt supply of Indian labourers through estates own kanganys. We can supply 5,000 per annum.

" All that is necessary is to send two or three kanganys to our agent in India and the coolies will be promptly supplied; payment against shipment.

" The price is $25 each, delivered at Port Swettenham,

" We guarantee first quality labourers and should you wish you may appoint your own representative at port of shipment to select the labourers before shipment. All coolies will be passed by the Government doctor before being engaged.

" If this interests you kindly write us for further particulars.

We are, etc.,
(Signed) THE LABOUR ASSOCIATION, LTD.

The MANAGER,
The Oriental Rubber Company,
Negri Sembilan.

and is instructed to refer this correspondence to the Indian Immigration Committee.—*Minutes of Meeting of the Planters' Association of Malaya.*

(CEYLON PLANTERS' ASSOCIATION, ANNUAL MEETING AT KANDY.)

THE LABOUR QUESTION.

Turning to the labour question Mr. Bliss said that practically nothing had come before the Association during the past year for the reason that at the beginning of 1912 their Association, having passed certain resolutions on the matter these were referred to the Proprietors' Labour Federation. The body had certainly accepted and more or less agreed to adopt the resolutions and recommendations passed by their Association, but up to now no meeting of that body had been held. He believed, however, that it was to be held quite shortly.—*Weekly Times of Ceylon.*

The report of the Registrar-General on the Vital Statistics of Ceylon, for the third quarter of 1912, is given as a Supplement to the Ceylon Government *Gazette* of the 10th instant. The estimated population of the island on the last day of the quarter was 4,183,302, showing an increase of 22,641 on the preceding quarter, due to an excess of 20,432 arrivals over departures of Indian coolies and of 2,269 births over deaths. The number of Indian coolies who arrived in the island during the quarter was 38,936 and of departures, 18,504 as against 30,942 arrivals and 16,416 departures, the average for corresponding quarters of the last 14 years.—*The Indian Planters' Gazette and Sporting News.*

EXPLOSIVES.

Views of Mr. R. M. Lyne, Director of Agriculture, on Dynamite in Planting.

The use of dynamite in agriculture is now coming to be recognised as an important factor, and that the time is not far distant when it will be largely adopted on tea, rubber and other plantations is the opinion of Mr. R. N. Lyne, Director of Agriculture, who was interviewed on the question by the Kandy representative of the *Times of Ceylon.*

Experiments go to show, according to Mr. Lyne, that dynamite can be used with advantage to break up hard and impermeable soil; desiccate what is known as hard pan found below the ordinary open sub-soil in our plantations: and thus form channels for the free entrance of air and rain water; effectively remove tree stumps and roots, which are such an obstruction, in clearings; make holes for planting trees in *the* way in which they should be made; break up lands to equalise water supply; open trenches; aerate sub-soils and counteract any tendency of the ground to become infected with pests or charged with poisonous toxins, and perform many other labour saving operations.

AS A SUB-SOILING AGENCY.

The value of dynamite as a sub-soiling agency Mr. Lyne said was very great, and the ideas of using it in connection with planting were many and varied. Several demonstrations were given at Peradeniya, and a plantation had been laid out after using dynamite in the preliminary operations.

Constant cultivation, as our planting readers are aware, results in a hard pan being formed a few feet below the surface which is absolutely impervious to water. In some tea districts the existence of hard pan has been regarded as a misfortune that had, of necessity, to be accepted. All this, however, will now be a thing of the past; and the planter can so treat the most impermeable soil as to derive the greatest possible benefit from it. The idea of sub-soiling with dynamite, Mr. Lyne pointed out, was not to disturb the top soil but to break up the hard pan effectively. The cartridges were inserted at the required depth and fired; and while there was not much movement on the top, the soil below was broken up for some distance all round. The harder the ground the more effective the explosion owing to the resistance offered, while in loose soil it was practically useless.

"The effect of dynamite in soil, it must be remembered," he added, "is in inverse ratio to the amount of earth thrown up." The hard ground through which the rootlets of trees penetrate with the greatest difficulty and which supplied no nourishment, Mr Lyne went on to say, was broken up all round, cracks and fissures radiating from the centre of the explosion. Moisture would now be conserved, and the plant rootlets would have no difficulty in receiving new nourishment which would develop the growing plant in a remarkable manner. Storm water instead of running off the land would sink into the cracks and fissures in the soil and be conserved and prove invaluable to the plants in the hot season.

The roots of plants drew from the surrounding soil the required nourishment, and water or moisture was the carrier of such plant food. There is always a water table, Mr. Lyne proceeded to demonstrate, and plants absorb the water which soaked upwards as the ink spreads in a piece of blotting paper dipped in the ink pot. Therefore to make such water and plant food available to the plant there should be a loose, porous soil' which can be produced by dynamite explosion. The breaking up of hard pan and sub-soil also improved the drainage. After the monsoon rains especially some lands became water logged and "sour" which was so detrimental to plant growth. The breaking up of the soil would remedy such a state of things,

REMOVING TREE STUMPS AND ROOTS.

In the removal of tree stumps and roots from our plantations, especially new clearings, dynamite is going to play an important part, said Mr. Lyne. The thousands of tree stumps with huge roots left in the ground in some of our young plantations were most objectionable. The cost of digging out all stumps and roots on large estates must be great and the labour involved considerable, and for this reason in many cases, they were allowed to remain in the ground. Stumps and roots, while being a nuisance were, as regards those of some species, a source of danger, especially on rubber estates, Mr. Lyne remarked, as being productive of certain fungoid diseases.

THE FOMES PEST.

In this connection it might be pointed out that the dangerous root disease of Pará Rubber trees, assigned to *Fomes Semitostus*, has been traced to stumps in young plantations. Mr. T. Petch, Mycologist, says that practically in all cases this fungus develops upon a neighbouring jungle stump, at least in young plantations. After the stump has become permeated with the mycelium, we are told, the latter spreads out through the soil in search of food; and if this mycelium meets the root of a Hevea it immediately grows round and along it; and by the time the Hevea begins to die, the jungle stump from which the disease has spread is covered with the fructifications of the fungus. In one instance, where no stump was evident anywhere near, the fructifications, Mr. Petch says, were discovered on a log which had been buried beneath about six inches of earth; and in two instances the original jungle stump aad been completely devoured by white ants, but the fructifications had developed within the galleries of the termite hill. So it will be seen that there is some considerable risk in having stumps and roots in the ground in rubber plantations. Fomes, however, is said to attack stumps of certain species only; but with the cheap and effective method of removing stumps and roots, which die very slowly and which are an objectionable feature, there is no reason why they should be allowed to remain. For removing stumps and roots no method, it is said, is quicker or more economical than dynamite. The blast not only splits the stump into firewood and removes it but brings the root out cleanly from the ground.

IN TREE PLANTING.

Mr. Lyne explained that dynamite was also of the greatest importance in tree planting. It not only saved considerable labour and time, but it formed the hole in the proper way it should be formed—loosening the soil all around, breaking up any hard layers and thus giving the roots room to expand, while the plant derived the greatest possible benefit.' Contrast this with the method now followed where the cooly will spend hours digging in pot holes, most unsatisfactory concerns in, which the roots had no room to expand, and in which the water sometimes lay and rotted the roots, remarked Mr. Lyne. Besides this a large number of tree holes can be blasted simultaneously, while scores of coolies spend days to accomplish what can be more effectively done in so many minutes.

DESTROYING PESTS AND TOXINS.

Another beneficial result of such dynamite explosions, added Mr. Lyne will be in the destruction of insect pests and toxins in the soil. He thought that the gases generated would have the effect of killing the toxins, the poisons in the soil, which were destructive to the bacteria of nitrification; while it was possible that the explosion would also kill vermin and insect pests which harboured in the soil.

Besides all this Mr. Lyne concluded, dynamite can most effectively be used in draining land, in opening trenches or ditches, and in removing boulders from plantations.—*The Weekly Times of Ceylon.*

CEYLON PLANTERS' ASSOCIATION.

ANNUAL REPORT.

We have received through the courtesy of the Secretary of the Planters' Association of Ceylon the Fifty-ninth Annual Report for the year ending December 31st, 1912. It is too long to reproduce, but it is a satisfactory record of steady progress. With the ever-increasing need of Scientific advice in all its phases, the appointment of Mr. Lyne as Director of the Agricultural Department is one of great importance to Ceylon Planters. Transport is second only to the labour problem in Ceylon, and we shall reproduce next week some speeches made at the Ceylon Planters' Association on these two subjects.

The Report is outspoken and direct as to the duty of the Government to so open communications " that private enterprise may be encouraged to enter the field with motor transport and be hampered no longer as has been the case hitherto." The anecdote told by Mr. Sinclair in his speech on the Transport question, would be ludicrously amusing, were it not so deplorably illustrative of the method or want of method on the part of the Public Works Department to keep pace with the times. Liquid Fuel is largely displacing firewood, which is being rapidly exhausted, and transport rates have risen all round 10 to 15%. This is being inquired into as it appears to have become a monopoly, and threatens the break down of transport. The estimate of the Tea crop for 1913 is 189,000,000 lbs. There was a decrease in the export of Green Tea during 1912 of 953,278 lbs. as compared with 1911 due to the abnormal position in Russia. Rubber takes up a large portion of the report, as was to be expected. Tapping systems are almost entirely confined to paring the bark. Thinning out is discussed, and this debateable question is not settled, some advocating 100 trees to the acre, while others advocate up to 200 with high cultivation. The total shipments of Rubber for the year were 15,001,075 lbs. against an estimate of 12.320,000 lbs. There has been an increase of 8,500 cwts. over last season of Cocoa. Cocoanut suffered on account of drought, but it is satisfactory to learn that small native estate owners are cultivating their properties in an up-to-date method. Though cardamoms fell short prices have been satisfactory. The Government Entomologist and Government Mycologist contribute short reports on Insect Pests and Fungoid Diseases which add to the value of the Secretary's Report. The Coast Agency has been reorganised on a permanently sound basis. Railways and Telegraphs are duly noticed. We shall have more to say when the full report of the Meeting of the Planters' Association is received.

The Labour Question did not take up so much time or space as might have been anticipated seeing how important this matter is to the welfare of Ceylon, but the Ceylon Planters' Association evidently before taking action in this matter are awaiting the decision of the Proprietors' Labour Federation, who were shortly holding a meeting, a report of which we hope to receive before our next issue, and on which we shall comment. The recruiting of Labour from the West Coast so affects the planting community of Southern India, that any decision arrived at by the Proprietors' Labour Federation must be of interest to them. The tendency in Ceylon is to reduce the advances to within reasonable limits and will receive the support of all planters in all countries, and in the interests of all it is to be hoped that all Estates will join the Federation.

The Planters' Chronicle.

RECOGNISED AS THE OFFICIAL ORGAN OF THE U. P. A. S. I., INCORPORATED.

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THE U. P. A. S. I.

(INCORPORATED.)

Contents.

We publish a letter from Mr. Tipping asking for further information about Saltpetre as a means to get rid of stumps, and it is hoped that those who have had experience of this method will publish through this paper their experiments for the benefit of all.

It will be noted that the consumption of Indian Tea appears to be decreasing in the United States. There has been a suggestion that at the end of the War, Indian Teas should be pushed in Eastern Europe.

This week we reproduce two speeches made at the Annual Meeting, Ceylon Planters' Association, lately held at Kandy on the question of Motor Transport in the Island. Some time ago we published a letter from the Assistant Director-General of Supply and Transport on this subject, but without eliciting much support, and it is with the object of renewing interest in the matter that the two speeches are reproduced. We trust if the matter is taken up seriously that the Indian Government will move more expeditiously than the Public Works Department of Ceylon, who have not according to the speakers accorded much support. 19.

At the request of a correspondent, who thinks the matter will be of general interest, we reprint a pamphlet issued by the Board of Agriculture and Fisheries on the subject of Chafer Beetles and white grubs.

The Indian Tea Association have resolved to raise the subscription to two annas an acre to provide funds for the Scientific Department.

We publish, through the kindness of the Economic Botanist of the Government of Mysore, a list of awards made at the late Dassara Exhibition held in Mysore.

We have received through the courtesy of Mr. J. H. Twigg, a summary of the Official Reports on the Metric System, showing that nearly every country has adopted the system.

CORRESPONDENCE.

The Editor,
Planters' Chronicle,
Bangalore,

Dear Sir,--Being much interested in the subject of use of Explosives in Agriculture and more particularly in any efficacious and practical method of getting rid of undesirable shade trees and stumps, I have read the recent articles and correspondence appearing in your journal with great interest. But there are some points about which I am not clear. From what your correspondent "Colin Hindley" says, in his most interesting letter on the subject (Vol. VIII, No. 8, *P. C.*,) explosives are not very effective on soft wood stumps. This being so, and many of our shade trees being soft wooded, would he very kindly tell us if saltpetre is effective in all cases, soft and hard, green and dry stumps?

My own experience in trying to burn out hard wood dry stumps was not encouraging, but I would like to try again, with a little more light on the subject.

Some 12 years ago, I undertook some experiments with both saltpetre and turpentine. A number of hard-wooded dry stumps were bored, vertically with 1, 2, and 3 according to size of the stump one inch diameter holes 12" to 15" deep, in the dry weather (April) some of the holes were filled with a very strong solution of saltpetre, others were filled with turpentine and all were tightly plugged up with wooden plugs well hammered in. In September the plugs were taken out and the hole again filled and plugged up as before. In the following April, after removing a little of the surface soil round the stump, fires were lighted, but beyond using up a good deal of fire wood, and burning out some of the adjacent coffee trees, there was little result and the stumps would have been there to this day, had they not been jacked out.

I had followed out, carefully, all I had read on the subject and was naturally very disappointed at the result. Can you or any of your readers tell me where I went wrong?

Yours, faithfully,
(Signed) Percy G. Tipping.

The Government of India having decided to continue the Indian tea cess for another lustre, without, as far as we are aware, altering the terms of the charter. Mr. R. Blechynden, the Indian Tea Commissioner in U. S. A., will be given another chance to justify his existence and evangel. From his latest report he does not appear to have any notion of shifting his pitch from St. Louis, although shrewd critics say that he would be much better employed in stumping quite another part of the country. The tea trade in U. S. A. is very dull, and the consumption per capita shows signs of decreasing. It is quite heroic of the Indian Tea Industry to spend £10,000 or more a year to rouse our American cousins to a sense of their deficiencies in the appreciation of wholesome beverages.—*Capital.*

MYSORE DUSSARAH EXHIBITION, 1912.

Mr. Krumbeigel, Economic Botanist to the Government of Mysore, informs us that the following prizes have been awarded to the exhibitors who sent exhibits under Plantation and Garden products at the Exhibition of 1912 :—

No.	Name and Address.	Nature of exhibit to which award is made.	Date of despatch of Certificate.	Date of despatch of Medal.
		GOLD MEDALS.		
1.	The Maryland Tea Company, Nilgiris	Tea	18-1-1913	
2.	The Superintendent Glenmary Estate, Nilgiris ...	Tea	11-2-1913	
3.	Messrs. Matheson & Co., Hunsur	Coffee	6-1-1913	18-1-1913
4.	The Eldorado Estate, Mundakayam	Hevea Rubber	12-2-1913	
5.	The Cochin Rubber Co., through Mr. R. deRoos Norman	Collection of rubber and rubber seeds	16-12-1912	10-12-1912 No. 2306 dated 13-12 1912
		SILVER MEDALS.		
1.	The Travancore Rubber Co...	Pará Rubber	3-1-1913	14-12-1912
2.	Mr. F. L. Hamilton, Kadur ...	Collection of Coffee	7-2-1913	17-12-1912
3.	Mr. W. H. Reed, Kadur ...	Cardamoms	do.	do.
		HONOURABLE MENTIONS.		
1.	Messrs. Baily and Brock, Nilgiris ...	Coffee	8-1-1013	
2.	Mr. Ashley, Ashley Estate, Peermade ...	Tea	9-1-1913	
3.	Mr. Large, United Planters' Association, Bangalore ...	Aloe fibre	18-1-1913	

SOUTH INDIAN PLANTING.

At the last meeting of the Madras Legislative Council, an Hon'ble Member asked the Government to state the total number of persons registered in 1910-11 and 1911-12, and the six months of the current year in each of the six northern districts of the Presidency, in which the Assam Labour Act IV of 1901 was in force. The Government replied that they had no precise information regarding the number of persons registered under the Assam Labour and Emigration Act, 1901, during the periods referred to. The total number of persons (including dependants) recruited during the years 1910-11 and 1911-12 in the six districts were :—

	1910-11	1911-12
Ganjam	1,820	4,169
Vizagapatam	923	1,454
Godaveri	75	252
Guntur	85	63
Nellore	Nil	72
Kistna	Nil	20

The Government also said that they were not in possession of figures for the current year.—*Capital.*

THE PLANTERS' ASSOCIATION OF CEYLON, KANDY.

ANNUAL MEETING.

The following are the extracts taken from the Ceylon Planters' Association:—

RECRUITING IN INDIA.

The Secretary then read out the following telegram received from Mr. Scoble Nicholson, the Ceylon Labour Commissioner in India:—

"I am glad to report for the information of your general meeting that recruiting figures to date show an improvement of 15 per cent. over last year in spite of a satisfactory harvest. Further efforts should be made to recruit labour from the coast during the year, and new districts not already tapped should be exploited."

The announcement was received with applause.

MOTOR TRANSPORT.

Mr. M, L. Wilkins then proposed the following resolution:—

"That this Association respectfully calls the attention of Government to the fact that a more reliable and up-to-date form of transport has become an urgent necessity; that the progress and development of this Colony is in serious danger of disorganisation owing to epidemics among transport cattle; and that if motor vehicles, run as feeders to the railway, are not feasible, at least individual effort and private enterprise should be encouraged."

He said that at the Committee meeting held in the morning he was requested to add to that resolution the following:—"And that Government be respectfully asked to receive a joint Deputation from the Planters' Association and the Chamber of Commerce to confer with them on the matter." He asked the permission of the meeting to add that to his resolution.

Permission being accorded, Mr. Wilkins said he thought it was hardly necessary for him to enlarge upon the importance of that subject, and if any of them in a comfortable position with regard to transport had any doubt of it he would advise them to ask some of their brother planters in Uva. Rinderpest, he believed, had been known for some years in Ceylon, and the history of rinderpest in other countries, so far as he had been able to ascertain, was that it died out and recurred again, and each recurring attack was nearly always worse than the last one. The last attack in Natal culminated in the wiping out of something like 97 per cent. of the affected cattle. In addition to rinderpest they had had lately in Ceylon outbreaks of surra, foot and mouth disease and anthrax. He thought if they were to go into the conditions which had to be contended with in fighting epidemics of that kind they would find that they were about as bad as they could be. There was the geographical position of the country; districts were very scattered, and it was extremely difficult to surround or isolate them. In addition to that they had in practically every district a certain amount of scrub and jungle which harboured pig. The animals contracted rinderpest and spread the disease, and they had in them an absolutely uncontrolable method of spreading the disease. Then they had

STRAY CATTLE.

which Government had failed utterly and absolutely to control; and they were to be found in thousands all over the public roads of Ceylon, On top of stray cattle and pig they had the headman system of Ceylon. (Laughter). They all knew that there was a certain magic substance known as palm oil, and palm oil would allow cattle into affected areas, out of affected areas, would open doors and do all sorts of marvellous things. (Laughter). And, finally, they had Government machinery, which was about the most cumbersome machinery they could imagine. The Government Agent informed the Ratamahatmaya, the Ratamahatmaya informed the Korale, the Korale informed the Arachchi, the Arachchi informed the Vidane, the Vidane informed some one else, and by the time all these officials had been made acquainted with the state of affairs an outbreak of rinderpest had spread and had got beyond control. He thought when they took those conditions into consideration that he was justified in saying that the reason why their cattle had not been wiped off the face of the earth was due more to jolly good luck than to good management. (Applause). It was necessary for the success of any enterprise, any business, or any individual that it should be up-to-date and progressive, but yet with regard to the question of road transport he believed that their position was exactly the same as in

THE DAYS OF THE KANDYAN KINGS.

or he would go further and say in the days of the Kings of Anuradhapura, probably 250 B. C. In 1909 and 1910 they had a little experience of rinderpest in his old district, north of Kandy, and about 50 per cent. of their draught cattle died and his Association, of which he then happened to be Chairman, took up the matter and formed a deputation to wait on His Excellency the Governor, in Kandy. He (the speaker) had great pleasure in saying that they were most courteously and sympathetically received by the Governor, who went into the whole question of mechanical transport with them very carefully. He was perfectly convinced that there was no man in that room who was keener on motor traction or more up-to-date traction than their late Governor. (Applause). He had a remedy for all the practical difficulties that they could bring forward. They pointed out the narrowness of the roads and they asked him about the difficulty of passing over the bridges, and he had more or less a good sound remedy for over-coming every one of them, and he was absolutely convinced that it was through no fault of Sir Henry McCallum that they had not got a better form of traction today. The Governor on that occasion told them that the Director of Public Works was going home to find a suitable motor lorry. They knew something about the question of motor transport, but they did not know everything, but they were possessed of the knowiedge that the responsibility for the extraordinary inaction in the matter lay somewhere between the Director of Public Works and the Crown Agents for the Colony. (Applause). He did not quite know what the policy of the P. W. D, was in that matter, but he knew a good number of other Departments whose policy was best expressed in the words of the prayer "Give us peace in our time, O Lord" (Loud Laughter). He thought that the great mistake had been that the whole thing was a one-man show. He thought it was a great pity that only one man—the Director of Public Works was sent home to find a suitable lorry. He thought that it should have been put in the hands of a Committee and if they had had on that Committee a few Ceylon Planters, he thought they would have had some lorries on their roads at the present time, (Applause). The policy at present appeared to be

A DOG-IN-THE-MANGER POLICY.

They would not help them and they would not let them help themselves. He would not mention names, but they were informed in Committee the other day of an incident which occurred not very far from there. A planter acquired a lorry, but he was not allowed to use it and the only way he could get it to his factory was by re-building a culvert on his road at the estate's expense. He thought that that was a good exampls of the lack of encouragement on the part of the Government. (Cries of "Shame.") It was quite possible that the deplorable state of the Badulla-Bandarawela road might be brought forward as an example of what motor lorries would to do roads, and it was qulte possible that that fact might stop progress. He liked to answer any argument that might be brought forward from a commonsense point of view. (Applause). It was quite possible that the form of lorry used there was not suitable to Ceylon, but as a matter of fact he knew that lorries of a similar type were working satisfactorily in other parts of the world. Secondly, those lorries were running in a district subject to only one monsoon a year and, therefore, efficient road repair could only take place once a year. Thirdly he thought there must be a limit, and a definite limit to the carrying capacity of any road and if they exceeded that capacity—he did not care what form of traction they used—the road would probably give way. When the tonnage reached a certain point he thought they had a good case for railway and that had been abundantly proved in the case of Badulla. He had merely to mention that Government had sanctioned a railway there in spite of great geographical difficulties. He did not believe that any form of transport-cart, motor or anything else, could complete with a legitimate railway. Another point on which they could accuse Government of at least a little inconsistency was that their various Departments did not work together properly. Take, for instance, the Agricultural Department of which they had just heard something. It was a large Department for which a large sum of money was voted. They were informed of the best methods of cultivation, which in plain words simply meant more manure and more produce. Whatever efforts that were made in the one direction were nullified for want of facilities to bring up that manure and to remove that produce. He did not wish it to be imagined that he was wedded to any particular form of mechanical transport. He was not there to advocate lorries or wire ropeways or anything of that sort. Each case would have to be considered on its own merits and he had no doubt that in some districts they would best be met by railways, in others by wire trams, and in the case of short distances by motor lorries. The main thing was that they wanted

SOMETHING BETTER THAN BULLS.

Another aspect of the case, which he thought would appeal to their better feeling, was the humane question. He was only stating the plain truth when he said that they could not go for a journey of one hundred miles in any direction from that room without finding bulls with sore necks, broken tails, overloaded and showing other signs of ill treatment—a state of affairs that might be expected in Afghanistan or China, but which no one expected to find, or to be tolerated, in a British Colony. They would probably be told that "God helps those who help themselves," but if he might ammend that saying he would conclude with the exclamation that "God help us if we wait for the P. W. D." (Loud Applause).

AERIAL TRAMWAYS.

Mr. W. R. Biddulph who seconded, said he did not think there was very much for him to say on the question after all they had heard from Mr. Wilkins on the subject. He had dealt with all the points of any importance but it seemed to him that where must be some other reason besides the obstinacy of the Director of Public Works that had prevented His Excellency the Governor from successfully battling with and defeating the difficulty of transport during his five years of administry of the Colony. It seemed to him that it was the roads themselves that were not and never would be fitted to the transport that it was suggested should be put np in them. It seemed to him that the proposal they had seen lately put forward in Maskeliya and other districts for aerial tramways was one that was well worthy of consideration, not only on account of the efficiency of such means of transport, but also because it would take off the roads a great deal of traffic that proved very expensive for the roads to meet. He believed that he was right in saying that some Rs.700 a mile was saved on one road, after the railway opened, where the traffic was very heavy, The cost of up-keep dropped from Rs,1,000 per annum to Rs.300 per annum. That was a matter to be considered when the time came. The main point was that they should be able to impress upon His Excellency the Officer administering the Colony to-day the importance of that question, and he was sure that the members who would be suggested to them would be the best possible people to put the case fairly and properly before His Excellency.

Mr. W. Sinclair, who supported, the matter was simply that there were not bullocks in the country sufficient to cope with the transport at present on the estates. At one time they could purchase a pair of very good bulls for Rs.250. They would not be able to buy those bulls now under Rs.500. He had gone into the question of the up-keep of cattle very carefully and he had run carts himself, but he would never attempt to do so again. He would rather supervise 600 acres of tea land than supervise six carts. (Laughter). The trouble and inconvenience that one was put to was very considerable, and in addition to that the bulls were ill-treated in every possible way. Their transport at the present moment was 67 cents per ton per mile. That meant that at the very outside a cartman could make per week per cart from Rs.8 to Rs.10. Rinderpest came along, he lost a pair of bulls, and he was immediately Rs,500 to the bad. When that state of affairs comes about transport must come to a standstill, and they were at present on the verge of that. At the present time there was

A BREAKDOWN ON THE RAILWAY

and a great many carts had gone to other districts where they were highly paid, and the result was that in their district they were hardly put to obtain rice for their coolies. In addition to that he might say that the villagers immediately below him where practically starving. They were unable to obtain food for their daily requirements, and he had had himself to supply them with rice during the past fortnight. He had offered them work on the estate and he had offered them cash, but they said they did not want cash. "What is the use of it "? they said, we want rice, and if you cannot give it to us we must go hungry." The result was that he had issued rice to them in small quantities for which they were exceedingly grateful. Now with the non-paying business of carting it was absolutely necessary that some other means of transport should be brought forward. The Rangalla district foresaw that in 1909 and they requested His Excellency the Governor to receive a deputation on the question, which he did in May of 1909. In January, 1910, he visited the district and he saw their road, and he said that so far as he could see there was nothing the matter with the road, and that all that was required was a few sidings for the purpose of enabling their carts and other traffic to pass. He called upon the Provincial Engineer to send in a report as to how much that would cost, and he thought he was correct in saying that the amount was put down at Rs.8,500. Very well. They then came to the point as to who should pay for that. They were agreeable that a certain amount should be added per ton to cover the expense. It was not very much per ton and they agreed to it. The Governor said that they were the first to come to Government on the matter, and that therefore, they should be the first to receive the first motor lorry that was capable of travelling on their road, and he would give instructions that that should be carried out as soon as possible. He (the speaker) would tell them how quickly that had been done. The incident he referred to happened in January. 1910, and they had not received any further information on the subject except to say that lorries were being experimented with and that as soon as one was got it would be sent up. They heard nothing more on the subject at all. He went home in 1911 and in November 1911 he asked His Excellency the Governor if he would kindly let him know where the motor lorries were being constructed. He told him—he did not think he should mention names as it might lead to trouble—where they were being built. He went to see the builders and he asked them if they had received an order from the Ceylon Government for the construction of two motor lorries. They said they had and he thereupon asked where they were. They replied that it was

RATHER A FUNNY BUSINESS.

They said that some eighteen months ago a gentleman was deputed by the Ceylon Government to see them on the matter. They could not tell him who it was, but it was supposed to be the Director of Public Works or some-one of that description. (Laughter) They were put to considerable inconvenience to show that gentleman every possible type of motor lorry they could find, and after a considerable trouble he said he would let them know soon which type he required. They told him (the speaker) that eighteen months elapsed before they got an order for a lorry. They wrote back and said that the lorries that they had shown then were absolutely ancient and they had scrapped all the specifications and they would strongly advise the Ceylon Government to go in for something better which they were then constructing. The gentleman wrote back and said that he would take nothing except the one he tried eighteen months ago. (Laughter). Very well. They said that they recovered the orders and specifications from the scrap heap and began to make one. That was in November 1911, and this year the Colonial Secretary wrote to say that the motor had not arrived from England yet. (Loud Laughter.)

Mr. Sinclair said that they would see, therefore, the difficulties that faced them in getting Government to move in the matter. Personally he did not blame His Excellency the late Governor at all in the matter. He was exceedingly keen—no one could be keener in the matter—and he gave every possible grain of information with regard to what should be done, but he was not surprised at his getting ill if his underlings put everything possible in his way to prevent things from being carried out. (Applause.) He believed that His Excellency the late Governor had written before his departure from the Island regretting very much that he had not been able to see motor lorries working on the Rangalla road. (Applause.) With those few remarks he had much pleasure in supporting the resolution.

SUPPORT FROM MASKELIYA.

Mr. Hew Kennedy, who was asked to speak on the matter in view of the great interest he takes in mechanical transport, mentioned that he had not prepared a speech, but would very strongly support the resolution. Really he did not think that he ought to speak after the excellent speeches that had been made. They could not let that occasion pass without saying that Government must be made to move. If they would not move, the whole weight of the gentlemen in that room must be put against them and then they must move. (Laughter and hear, hear).—*The Weekly Times of Ceylon.*

BOARD OF AGRICULTURE AND FISHERIES.

Chafer-Beetles or White Grubs.

The Large Cockchafer (*Melolontha vulgaris*)

DISTRIBUTION AND PLANTS ATTACKED.

In the majority of districts in Great Britain " Chafergrubs " or " White-grubs " are more or less abundant. The damage they do in the larval or grub state is often very serious, but is perhaps more frequently attributed to the work of the wire-worm. Not only do these insects cause loss to the farmer, gardener, and forester by damaging the roots of plants when in the grub stage, but much harm is also done by them when they appear as adult beetles. The beetles feed on the leaves of various forest trees, occasionally quite stripping them of their foliage, particularly broad-leaved species, although conifers are also attacked. Fruit trees are occasionally attacked by them, as also grass, corn, peas, and many vegetables. It has usually been supposed that this loss is due to the Large Cockchafer (*Melolontha vulgaris*), but this large chafer is no more abundant and harmful than two smaller species known as the Garden-chafer Bracken-clock or Coch-y-bonddu (*Phyllopertha horticola*), and the Summer-chafer (*Rhizotrogus solstitialis*).

These insects are much more abundant and destructive in France, Germany and other parts of Europe than in Great Britain; but as during the past ten years they have very materially increased in this country, farmers and gardeners should guard against them wherever possible. The grubs feed on almost any roots, but are particularly prone to attack those of grass and seedling trees. Young oaks and pine-trees often suffer severely both in this country and on the Continent. The grubs, bite the roots, thereby checking the growth of the plants and frequently killing them outright. In grass land, the grass may often be seen dying from the ravages of these pests. Rooks are very fond of white grubs, and are attracted to the fields to feed on them. These useful birds are often unjustly accused of injuring the grass plants, whereas they are really feeding on the chafer-grubs which destroy the grass. The beetles are perfectly easy to distinguish from one another, but the grubs of all three are very similar when young, and can only be identified by microscopic examination. This is a somewhat important matter, as there is a difference in the life-histories of the three species in regard to the time of appearance of the adults and the duration of the grub stage. It is important to notice the time of appearance of the adult beetles, as the pests are then easiest to destroy; they are very difficult to combat when in the grub stage in the ground, especially in grass-land.

DESCRIPTION.

(1) The *Large-chafer*, usually called the *Cockchafer*, is often an inch in length, with head and front portion of the body black, the wing cases (elytra) being reddish-brown, hairy, and with five raised lines on each; along each side of the abdomen are five white triangular marks. The abdomen ends in a prolongation, downwardly curved. and not covered by the elytra. The end joints of the antennae form a kind of club, made up in the male of seven leaves and in the female of six.

(2.) The *Summer-chafer* is somewhat smaller, being about two-thirds of an inch long, of a general reddish-brown or yellowish colour, the colour varying. The wing covers have each four raised lines. Fresh specimens are distinctly hairy, and the club at the end of the antennae has three leaves, both in the male and the female.

(3.) The *Garden chafer* varies from one-fourth to one-half of an inch long, the front part of the body is of a metallic greenish colour, and the wing cases of a reddish-brown hue; the male is very hairy.

(4.) A fourth species of chafer is *Cetonia aurata*, the *Green Rose-chafer*. This beetle measures two-thirds of an inch in length, and is golden green above; the wing-covers are marked with white specks and streaks.

The garden-chafer appears in June, and July, and the summer-chafer about the same time, whilst the large or cockchafer usually occurs in May and June, as also does the green rose-chafer. There are slight differences in the times of flight according to weather conditicns.

The grubs are thick, fleshy, and dirty-white, the tail end of the body being swollen and darker in colour; the head is large and brown, the mouth being armed with strong mandibles, which vary somewhat in each of the three species; there are also three pairs of jointed legs on the front of the body. These white grubs lie with their bodies bent, and although sluggish when taken out of the soil, are comparatively active when in it. In habits and external appearance the larvae are very similar, but when full-grown there is a marked difference in size; the grubs of the cock-chafer and the green rose-chafer reach one-and-a-half inches in length and are thicker in proportion than those of the garden-chafer and the summer-chafer; which, when full-grown, are distinctly smaller.

The grubs can be further distinguished from one another by the following microscopic characters seen in the mandibles;—In the large-chafer the mandibles have a granulated area where the light and dark parts of the jaws unite; in the summer-chafer the whole surface is very minutely granulated; in the garden-chafer there is a pale oval area with file-like ridges across it. The cock-chafer grub can be further distinguished from the garden-chafer grub by the fact that the claws of its front pair of legs are longer than those of the second pair, and those of the second pair longer than those of the third pair, whereas in the grub of the garden-chafer the claws of the front pair of legs are shorter than those of the second pair, and those of the second pair shorter than those of the third.

The larvae of the green rose-chafer resembles that of the cock-chafer but has a large rusty spot on each side of the first segment behind the head; its feet, too, are pointed, and the body is covered with transverse rows of short hairs.

LIFE HISTORIES.

The Cock-chafer.—The female burrows into the earth and lays her eggs, 12 to 30 at each laying, and near one another, and up to 70 in all. After five to six weeks the larvae hatches out. No great damage is done till the second summer, when the grubs gnaw the roots of grass and agricultural plants and seedling trees, the feeding being continued during a third and a fourth summer, when the grub becomes a pupa in the soil. but the beetle does not appear above ground for egg-laying till the next May, *i.e.*, a new generation of beetles may, in our climate, be expected every four years. The cock-chafer flies towards night, resting sluggishly during the day on trees.

The Summer-chafer has a similar life-history, but the grubs are destructive more to agricultural plants than to young trees. The beetles rest in the day time and fly in the evening. They sometimes appear in thousands. There is not complete agreement as to the length of the life cycle, but very probably it can be completed in one year. The swarming of the adults lasts for only a few weeks, and may, under similar weather conditions, be expected at the same time in the next year, *The Garden-chafer.*—This beetle flies in the bright sunshine, and often in great swarms. The mature beetles strip trees of their leaves, and are destructive to turnips. peas, and garden plants, *e. g.*, roses. Young fruits are also attacked. The grubs are especially harmful in grass land, the roots being bitten through. There is one generation during the year.

The Green Rose-chafer also flies in the day time in bright summer weather, resting sluggishly during dull days. The adults are harmful to leafage and especially to flowers, *e. g.*, strawberry and other rosaceous plants, turnips, &c.,—the stamens of flowers being destroyed by the biting off of the anthers. An interesting point as compared with other beetles is that during flight the wing covers of this species are not spread, but only slightly elevated so as to allow the spread of the two hind or flying wings. The eggs are laid in the ground, in rich garden soil; the grubs have also been taken from the rotting wood of tree stumps. Pupation takes place under cover of a cocoon of earth the exterior of which is rough. Two or more years may be required to complete the life cycle.

In certain years these beetles are noticed to be more abundant than usual. These "chafer-years" are fairly regular, occurring every fifth year where the large-chafer is commonest, and every year where the garden-chafer and summer-chafer are most prevalent. It is very important to note the year in which these creatures occur in great numbers, because the next brood can be foreseen and steps taken to destroy the beetles at once. It has been noticed that these insects are somewhat local although wide-spread, certain fields being attacked time after time while neighbouring fields are, quite free from infestation.

METHODS OF PREVENTION AND REMEDIES.

Remedial measures are most effective during the beetle stage, hence the importance of having accurate data in regard to "chafer" years.

(1.) The best way of preventing the injury caused by these insects and their grubs is to destroy the beetles when they appear upon trees, &c., in the early summer. In France and Germany systematic warfare is waged against these pests, and it is only in this way, and by concerted action on the part of the farmers, that any real benefit will accrue in districts where chafer larvae are very harmful. A single farmer on a Mayenne estate in France collected 2,000 lbs. of cock-chafer in the summer of 1889, and as each female may lay as many as sixty to seventy eggs the importance of such wholesale destruction is self-evident. In destroying and collecting the beetles, it should be noted which is the abundant chafer in the neighbourhood. If it be the cock-chafer or the summer-chafer then it must be attacked in the day time, especially during bright weather; and when the weather is dull, or late in the day, if it be the garden-chafer or the green-rose-chafer, for these are day fliers and often very active in the sunshine.

(2.) The beetles may be beaten down on the tarred boards from the trees and shrubs by means of long sticks. or they may be collected into sacks, and killed. This should be done, in the case of the cock-chafer and summer-chafer, during the day, when the beetles are very sluggish, and when they are found clinging to the lower surface of the leaves. If they are shaken on to the ground, pigs may be employed to destroy them as they are greedily devoured by these animals.

The beetles are best sought for on isolated trees and bushes, as they are said to go into woods only in bad weather. The trees should not be too vigorously shaken, or the beetles may fly away instead of falling down.

Attention must be paid to the kind of beetle to be reaped on account of the different times of appearance.

(3.) Trapping the larvae has also been resorted to with marked success. For this purpose, pieces of turf from eight to twelve inches broad and six to eight inches thick are laid, with the grass downward, on the surface of the ground. The larvae collect beneath the turf. Heaps of turf, humus, dung, &c., may also be employed as larval traps.

(4.) When the grubs are working in the soil, gas-lime and kainit as "top dressings" have beeen found of benefit. On pasture land, where the attack is worst of all, a heavy dressing of gas-lime has frequently been used, and is found to kill the grass and the grubs. This seems too drastic a measure; but it must be done thoroughly if any good is to ensue and the grass grows strongly the following year, almost too strongly according to one report (Ann. Rept. Zool. R. A. S. E., 1894). Dressings of kainit at the rate of 5 cwt. to the acre have been known to do much good on grass land, as has also basic slag at the same rate. The effect of all these dressings, however, depends entirely on the weather conditions. Kainit has a decidedly injurious effect upon soft larvae; basic slag probably only acts as a stimulant to the plant.

(5.) In the case of corn and pulse crops frequent horse side-hoeing does some little good, and in the case of garden cultivation soot and lime have been freely employed, but in the latter case hoeing and hand-picking are preferably recommended. Frequent reports are received regarding the garden-chafer on strawberry roots, but little can be done to rid the plants of this pest in the summer. Dressings of kainit, however, or a heavy dressing of soot, might be tried in the early spring.

(6.) The rook, starling, green plover, and the black-headed and common gulls should be encouraged, as they devour large numbers of white and other grubs. The two birds last-mentioned often occur far inland, and may be seen following the plough and greedily picking up any larvae that are thrown up. The adult chafers are eaten in large numbers by owls and night-jars. Bats also eat them, and moles hunt in the ground for the grubs.

(7.) Attempts have been made in France and Germany to destroy the chafer larvae by infecting them with fungoid diseases. Two species of fungi have been experimented with—*Botrytis tenella* and *Isaria densa.* Infection is communicable by means of living infected grubs, but not by dead ones. The results are at present not sufficiently satisfactory to warrant the extensive employment of this method of destroying the larvae.

4, Whitehall Place, S. W.,
April, 1896.
Revised, October, 1904.

At the annual meeting of the Indian Tea Association on Friday last it was unanimously resolved to raise the rate of subscription for the current year to two annas per acre under tea cultivation. The object of this increase is to provide additional funds for the Scientific Department, which so far has been unable to convince the planters that it has done them useful service. One would think that it would be much better to spend £10,000 a year on scientific investigation and experiment than to throw it away in advertisements in American papers which fail to set the fashion in tea. —*Capital.*

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THE U. P. A. S. I.

(INCORPORATED.)

Contents.

We publish the reports of two District Associations—Central Travancore and Mundakayam. The latter Association is especially to be congratulated in the inauguration of the Motor Transport Service.

The Scientific Officer, who is still on tour, has collected a very interesting summary on Nitrogenous Soil Constituents and their bearing on soil fertility from the U. S. Department of Agriculture.

The Manager of the National Bank of India has written to us as follows "The Directors propose to pay a dividend for the half-year at the rate of 12% per annum plus a bonus of 2% making 14% for the year, to place to credit of Reserve Fund £50,000 in addition to the £50.000 added to it in September, to place to credit of Officers' Pension Fund £10,000 and to write off from the Premises Account £10,000, leaving £64,000 to be carried forward to the next account. The total nett profits to December 31st, 1912 amount to £324.000."

The Managing Editor on application will be happy to supply Pamphlets, Rules, and Application form of the European Defence Association. Branch Rules are in the Press. We hear that the formalities in connection with the Madras Branch are practically complete.

We have received the first number of the *Ceylon Planters' Gazette*, the official organ of the Ceylon Planters' Association and wish the Editor all success. It has begun well and its usefulness is bound to increase.

Mr. Hindley has written in reply to a question put by Mr. Tipping with regard to the use of saltpetre. He suggests the use of crystals in place of solution, and that in the case of hard woods saltpetre, just as it is bought, should be used. Dig a small hole directly under it, put a small fire in and cover with bark or sods. In the case of soft wooded trees he feels certain the results must be satisfactory.

DISTRICT PLANTERS' ASSOCIATIONS.

Central Travancore Planters' Association.

The Annual General Meeting of this Association was held at Kuduakarnam Bungalow, on Saturday, February, 22nd, 1913, at 10 a.m.

PRESENT.—Messrs. F. Bissett (Chairman), J. A. Richardson, H. C. Westaway, J. H. Ellis, A. R. St. George, J. S. Wilkie, W. H. J. Milner, R. D. Scoble Hodgins, F. W. Winterbotham. Messrs. H. C. Bracher, R. L. Goldsmith and A. Slater (Visitors) and R. P. Roissier, (Honorary Secretary).

The notice calling the meeting was read.

The proceedings of the last meeting were taken as read and confirmed.

HONORARY SECRETARY'S REPORT.

Mr. Chairman and Gentlemen,—During this year under review 7 Committee Meetings and 4 General Meetings have been held.

Roads.—It was decided at a Committee Meeting held on 1st October that the Road Committee should have their own Honorary Secretary and this was confirmed at the General Meeting held on 26th October. I accordingly handed over all accounts, cash and correspondence belonging to roads, to Mr. Haslam who was elected Honorary Secretary, Road Committee. This decision is to my mind a very wise one. I think that everyone will agree that never before have the Planters' Roads of Peermade been in such good order.

Labour Rules.—The same rules as existed in 1911 have been carried over. The rules have in the past been looked upon too much as purely Association Rules. It is, I think, to be regretted that they are not treated more as District Rules and that Estates outside the Association and in this district do not fall into line and agree to abide by these Rules.

Labour Rates.—The Committee have constructed a scheme for the revision of rates and this is to be brought up for discussion immediately.

Membership.—The Association consists of 13 members representing a declared acreage of 5,996 acres.

The Crop for 1912 is 3,190,280 lbs. from an acreage of 5,489·54 acres, this represents an average of 581·16 lbs. per acre.

ACCOUNTS.

		Rs.	A.	P.
Receipts—				
By Balance from last year	...	900	0	0
„ Subscriptions for 1912	...	1,149	2	1
Bank Interest ...	...	17	6	0
Refund from U. P. A. S. I.	...	9	6	9
	Rs...	2,075	14	10
Expenditure—				
To Expenditure for 1912	...	1,845	6	7
„ Balance to be carried forward	...	230	8	3
	Rs...	2,075	10	10

Detailed Accounts are laid on the Table.

I wish to thank you, Gentlemen, for the honour you have done me in electing me as your Honorary Secretary and I now beg to tender my resignation.

Correspondence.—Read letter from the Assistant Secretary, Indian Tea Committee No. 170 T. C. dated 27th January, 1913.

Read letters from the Honorary Secretary, South Travancore Planters' Association, dated 18th November 1912 and 18th January 1913.

Read notice from Mr. W. Forbes Mackay *re* the Alleppey Regatta.

Read letter from the Honorary Secretary, Kanan Devan Planters' Association dated 4th December 1912.

Read letters from the Secretary, U. P. A. S. I. No. 39/12 of 20th November 1912; No. 40/12 of 28th November, 1912; No. 42/12 of 16th December, 1912; No. 1/13 of 13th February, 1913.

Read Circular No. 39 from the Indian Tea Association and it was agreed by all the members that in future they will have 'Pure Indian Tea' marked on all chests.

No reply having been received from the Excise Commissioner *re* the Kuttikanom Arrack Tavern, the Honorary Secretary was instructed to bring this to the notice of the British Resident.

Sri Mulam Delegate's Report.—Mr. Westaway informed the Association what had taken place at the Assembly and explained what had been done with regard to several items which had been brought forward which were of interest to this district.

Mr. Roissier proposed a hearty vote of thanks be given to Mr. Westaway for having so ably represented this Association at the Sri Mulam. Seconded by Mr. Ellis and carried with applause.

Labour Rates.—The revised rates as drawn up by the Committee appointed for this purpose were brought before the meeting and after each item having been fully discussed the rates were passed.

It was resolved that the Honorary Secretary write to Mr. Slater (Assistant Engineer, Peermade). *re* the building of Water troughs on the Ghat road.

Resolution by Mr. Westaway.—"That this Meeting records its appreciation of the very able way in which the Chairman and the Honorary Secretary have conducted the affairs of the Association during the past year and accords them its very hearty thanks."

Seconded by Mr. Richardson and carried with applause.

The Chairman at this stage said: "Before resigning the Chairmanship, I would like to express my thanks to the Committee for their advice and to the Honorary Secretary for the tactful and business-like way in which he has carried out his duties during the past year."

Election of Office-Bearers for 1913.—On a vote being taken the following were appointed:—

Chairman	... Mr. F. Bissett.
Vice-Chairman	... Mr. T. C. Forbes.
Hony. Secretary	... Mr. R. P. Roissier.
Committee	... Messrs. W. H. G. Leahy and H. C. Westaway.

With a vote of thanks to the Chair the Meeting terminated.

(Signed) REGINALD P. ROISSIER,
Honorary Secretary.

Mundakayam Planters' Association.

Minutes of the Annual General Meeting of the Mundakayam Planters' Association, held at the Chennappara Bungalow, on Saturday, 1st February, 1913.

PRESENT.—Messrs J. R. Vincent, (Chairman), W. A. Asher, E. S. Conner, Ed. E. Eyre, E. R. Gudgeon, Ashton Hamond, Eric Hall, R. Harley, H. B. Kirk, R. Lescher, C. Martin, Malcolm Smith, R. Tait, P. H. Vogel, Geo. West, and Edwin Vincent (Honorary Secretary). *By Proxy.*—Messrs. G. H. Danvers-Davy and J. J. Murphy.

At the outset the Chairman proposed a vote of condolence with the family of the late Mr. R. A. Fraser of Kuppukayam, which was passed, all members standing.

Business.—The Minutes of the last meeting were taken as read.

The Honorary Secretary's Report.—The Honorary Secretary said :—

" Mr. Chairman and Gentlemen,—I will endeavour to be as brief as possible in presenting my report of the year's work as we have a good deal of business to get through to-day.

" First of all the following figures will, no doubt, interest you. Under Rubber alone the district comprises (exclusive of 1913 clearings) 11,893 acres Rubber, 472 acres Tea, and 145 acres of Tea and Rubber interplanted, a total of 12,510 acres which is an increase of over 1,500 acres on last year's figures. The native openings in the district have also considerably increased and I have information before me showing that at the close of 1912 these holdings amounted to some 1,700 acres. This brings the total area in the district under cultivation in Tea and Rubber alone to a little over 14,000 acres.

" I cannot compare crop figures with previous years as this information is not on the records of the Association, but the out-put in 1912 amounted in round figures to 360,000 lbs. Rubber and 730 lbs. Tea. These figures will show you what an important factor we have become in the Rubber world, and I hope that some successor of mine will be able to say the same with regard to Tea.

"The strength of the Association is 17 Estates with a membership of 32 (at the close of 1912) including Assistants.

" As far as subscriptions are concerned, I am pleased to state that although some Estates have been rather tardy in their responses to my appeals, all outstandings for 1912 are now in. I hope my requests for the 1913 subscriptions will meet with better luck and that members will send in their payments in good time this year.

" Speaking of tardy people, I am sorry to say that only Rs.205 were collected during 1912 for the Planters' Benevolent Fund by my predecessor and myself. I do not think there is any doubt in your minds as to the excellence of this fund, and I should like to see subscriptions coming in more regularly.

" The Accounts for the year are on the table and you will have the pleasure of hearing later on at this meeting, the report of the Honorary Auditor—Mr. H. B. Kirk. The very sound financial position of the Association will no doubt be appreciated by you all.

" With regard to the year's Secretarial work, at the beginning of the year the Tolls at Kanjirappalli Bridge were the cause of a good deal of trouble with the bandymen, which was, however, happily settled. During the year the Kottayam-Kumili Road from the 13th to the 29th mile has been remetalled, according to the 'Gazette,' and Government has been approached with a view to having the road improved, now that planters are taxed in the shape of the Toll at the Kanjirappalli Bridge I have had the pleasure of announcing at one of our Quarterly meetings that arrangements have been made whereby vehicles returning through the gates within 24 hours only pay one toll.

"Mr. Asher's requests with regard to the Lalam-Erutapetta Road have also been constantly before us as well as the question of establishing a Telegraph Office at Erutapetta. I have continually agitated Government and the Director of Telegraphs respectively with regard to these matters and hope for improvement. So far I understand that the Postmaster at Erutapetta has been empowered to transact Insurance and Savings Bank business, which is an indication, I hope, of the thin end of the wedge.

"Another question dealt with in the part of last year was the high rates of freight obtaining from Indian and Ceylonese ports to England. I am afraid the shipping combines are too strong for us to do anything this end, at least our representations have come to nought.

"The subject of Mr. Hamond's arrest was taken up very strongly with Government, but nothing can be done until the suit filed by the Contractor against Mr. Hamond is disposed of. I have asked Government for the case to be accelerated as much as possible.

"The next thing I have to speak about is the New York Exhibition of 1912. Unfortunately the district was not represented, members refraining from exhibiting, as many factories were still in course of erection and machine made samples could not consequently be sent. It may be of interest to you to know that Gold and Silver Medals of the Rubber Growers' Association, London, were won, I believe, by Highlands and Lowlands, and Rosehaugh Estates respectively, with samples of Smoked Sheet.

"The usual U. P. A. S. I. and Mysore Exhibitions were also held but only two Estates sent samples, one of which was successful in gaining a diploma. I understand, further, that some of the samples have been retained for the Economic Museum, Bangalore.

"There will be another Exhibition in London, in June 1914, and some pamphlets I have received in connection with it, are on the table. I have had considerable correspondence with the Organising Manager—Mr. Staines Manders—and it is hoped the district will be well represented. I shall have a proposal to make regarding this when the matter comes up for discussion.

"Other matters dealt with during the year include Mr. H. B. Kirk's complaint of delay in delivery of parcels, and I am in communication with the Postmaster-General on this subject. I have also approached the various newspaper firms with a view to being placed on their complimentary list but without success. I think a 'cuttings book' would be of great interest and use to future Honorary Secretaries.

"In August last we were very ably represented at the U. P. A. S. I. Meeting by Mr. G. H. Danvers-Davy whose report has been placed before you. With regard to our representation at the Sri Mulam Popular Assembly I have recently been in communication with the Chief Secretary to Government. For this year, at any rate, only one representative can be sent from the combined districts of Peermade and Mundakayam, but I hope the matter will be followed up and that in 1914 we shall have our own representative at this Assembly.

"I had the pleasure of according our appreciation of Government's action in appointing a planter—Mr. J. A. Richardson—to the Legislative Council, Trivandrum, and we are under a great obligation to Mr. Richardson for the good work he has done and is now doing for the planting community. A good deal has been said about the Labour Act of Travancore and we all await the result of Mr. Richardson's representations to Government in this direction.

"A meeting to elect a member for the planting community to the Legislative Council at Fort St. George, was held in December last and the members present unanimously voted for Mr. Richardson. Our nominee, however, was not successful, Mr. E. F. Barber, being elected by a large majority.

"As the result of direct representations made to Government by the Association, Messrs. S. P. Mel & Co., Mundakayam, were granted a license and the proximity of this shop to the Travellers' Bungalow is greatly appreciated by many of the community and others passing through.

"An important question was brought up in July by the South Travancore Planters' Association—that of seceding from the U. P. A. S. I. and forming a combined Association in Travancore. As you are aware, for various reasons, we did not feel disposed to do this.

"At our last quarterly meeting the question of subscriptions was brought up and it was decided to continue paying on our old basis. At that meeting also Mr. Richardson spoke on the question of Tobacco duties and I have since had some correspondence with the Chief Secretary to Government on the subject. From his letters I gather there is no likelihood of either the duty being removed or permission given to import Tobacco by post. Perhaps Mr. Richardson will have an opportunity later on of again taking the matter up with Government.

"At the meeting just referred to, Mr. A. W. L. Vernede was a welcome visitor and you were, no doubt, appreciative of his announcement that the Kanjirappalli Court House would, in all probability, be built on the present T. B. site at Kanjirappalli and the T. B. moved further back.

"A good deal of spade work has been done by your Committee and Officers during the year. We have seen the Motor Transport Scheme blossom into an accomplished fact and, I believe, working admirably. The Medical Fund has taken up a good deal of time but with excellent results, and another important work has been accomplished in the Revision of the Rules. The new book lies before you. In it you will find the new rule with regard to Private Members, and the Association is to be congratulated on enrolling its first private member in the person of Mr. J. A. Richardson.

"Another important Scheme which a memorable year has seen completed, or practically so, is the Scientific Officer Scheme. A year ago the cess seemed rather a heavy one but with the increased acreages we have been able to keep it down to an initial 11 annas per acre and 10 annas per acre subsequently. Only 90% of the acreage is participating otherwise another anna might have been knocked off the cess. I put it to those outstanding that they would do well to come in.

"I am afraid my report is rather a lengthy one, but I hope you will agree that it is not owing to any undue verbosity on my part but the simple record of a busy year. In conclusion, I should like to record my great obligation to our Chairman, the Committee and the members in general, for their co-operation and with this, Gentlemen, I place my resignation in your hands."

Mr. H. B. Kirk moved the adoption of the Honorary Secretary's Report which was seconded by Mr. A. Hamond and carried unanimously.

The Auditor's Report.—Mr. H. B. Kirk said:—

"Mr. Chairman and Gentlemen,—Owing to the death of Mr. Fraser, who was appointed as my co-auditor, I was asked by our Chairman to undertake this work by myself. Prior to July 1912 the Association's books were kept in rather a haphazard fashion. Our present Honorary Secretary, Mr. Edwin Vincent, has reorganised the accounts, and placed them on a business basis, and I think we owe him a hearty vote of thanks for this.

"I would like to see a list of the District Subscribers to the Planters' Benevolent Fund laid on the table at the general meeting. I suggest that the acreage and rates of subscriptions should be entered in both the ledger and the journal against each item to admit of easy checking when auditing.

"I audited the books at Eldorado Bungalow on January, 2nd and certify them as being correct."

Mr. R. Harley moved the adoption of Mr, Kirk's Report which was seconded by Mr. West and carried unanimously.

The Chairman's Report.—The Chairman said:—

"Gentlemen,—Before recounting to you the results of my stewardship for the past year, I have a sad duty to perform and that is to ask you to rise in respect to the memory of our late member, Mr. R. Fraser, who died since our last meeting. We have been singularly unlucky and unfortunate in losing two good men during the year in the persons of F. H. Hall and R. Fraser, who were both well-known for genial good fellows, and whose places it will be hard to fill.

"As our Honorary Secretary has given us a thorough resumé of the work done by the Association during the year, and also what I hope will prove interesting figures of acreages, Members. Estates and crops, I will not take much of your time, so that we may quickly get through to our real business, the items on the Agenda.

"I should, however, like to make a few remarks on the state of the rubber and tea industry in Mundakayam, which, I think you will all admit, is in a very flourishing condition, and so long as our horizon is not clouded by some as yet unforeseen trouble—I am sure it will go on flourishing. We have seen a great change in planting methods and opinions in the last 5 years, we have changed the face of the country a good deal in that time, and, last, but not least, I believe, we have succeeded in putting back into our shareholders' pockets a little of the money they have so adventurously entrusted to us. From the best advisers at home, we now know that for a decade at least, we need not fear that old bogey of agriculture. over-production, and that in consequence, except for an incidental rigging of the market, we need not expect large fluctuations in prices such as have been seen during the last four years. The real bogey we have to face, Gentlemen, is of a darker hue, and represents our old friend and enemy, the cooly, and the note of warning which I wish to give in this connection is to beware of cooly rates going higher and higher, as they undoubtedly have been doing during the last decade. It will be a reflection on us as holders of our shareholders purse strings, if our cost of production, more and more every year, approaches the market value of our produce, and it behoves us as an Association to see if we cannot, not only keep rates from going higher, but also reduce them as much as we can, and I, for one, would like to see some Association rates adopted for future working. Advances too, seem to be getting higher and higher, and at the same time labour is not too plentiful, although I believe Mundakayam has been as well off, if not better, in this respect than most districts in South India.

"With regard to the crops we may expect in Mundakayam, I think we may congratulate ourselves, that we are getting as much per acre from our rubber, age for age, as our friends in that much vaunted little island, Ceylon, whilst our prices realised are as good as any fetched by any other rubber in the market.

"If we can keep our rates down to their normal level, which is much lower than that of the Straits or Ceylon, there is no reason why S. India Rubber Companies in general and Mundakayam Companies in particular, should not give higher dividends than those concerns whose capital costs are so high, and whose working is so dear, both in Ceylon and the Straits.

"With regard to Tea I have not so much to say, as only one Estate in the District—Peravanthanam—has reached the bearing stage, but from the growth we have, there is every reason to expect as rosy a future for this product as we expect for our rubber.

"The Association has agreed to the employment of a Scientific Officer for the District, and Mr. Nicoll has been asked to see Professor Wallace about the selection of a man likely to prove suitable for us. I trust the scheme will always command the support of the Association members and that those who are not participating in it will see their way to doing so at an early date. There is so much to learn in the finding out of the best method of producing the most latex in our trees, and again in the most economical extraction of it, that in this one branch alone, an alert scientifically trained man should be able to experiment and doubly repay us, by an actual increase of crop per acre, for all that we have decided to expend in this direction.

"In this connection, it has been said, I believe, by an eminent Ceylon Scientist, that Pink disease and Canker have been very prevalent in South India. I should like, here and now, to stoutly deny such an assertion so far as it concerns Mundakayam, and it can be easily disproved by any impartial observer paying a visit to any of the Estates in the District.

"The year has seen the inauguration of the Motor Transport Service which has already much benefitted the Estates who were bold enough to participate in it, and the scope of the service will shortly be extended by an addition of two new cars, after which another opportunity may perhaps be given to Estates to join in the scheme.

"With regard to the iniquitously high rate of freight on rubber to England, which the Association decided to try and get reduced, I am sorry to say that not much has been accomplished. I believe that the freight rates will be discussed and decided on the 30th of June next, however, and I would advice the Association to do its best, before then, to get a promise of a reduction in freight rates. I have been assured that strong representations are being made on our behalf by West Coast firms, and that it is very probable some reduction will be made, but we cannot expect a reduction if we quietly acquiesce in the present rates.

"As to legislation for labour troubles, this is in the air, as also a scheme of registration, which, so long as we have not got extradition will be useless to us. I fear legislation myself, and should be glad to find some mastermind had solved the difficulty for us in some other way.

"In conclusion, Gentlemen, I have to thank you for your hearty support during the term I have held office, and I now beg to place my resignation in your hands."

Mr. Eric Hall moved the adoption of the Chairman's report which was seconded by Mr. Ed. E. Eyre and carried unanimously.

Election of Office-Bearers.—The election of Office-Bearers for 1913 resulted as follows:—

Chairman	...	Mr. G. H. Danvers-Davy.
Vice-Chairman	...	Mr. R. Harley.
Honorary Secretary	...	Mr. Edwin Vincent.

General Committee: Messrs. Hamond, Hall, Murphy, Harley and Kirk.

The Kottayam-Kumili Road.—Mr. Danvers-Davy's resolution regarding the bad state of this road was read, and seconded by Mr. Kirk. The Honorary Secretary was requested to approach Government and ask for an improved road.

Local Building Rates.—Mr. Hamond's resolution to fix these in the district having been put to the meeting, Mr. Kirk proposed that the meeting go into Committee which was unanimously carried. In Committee the matter was freely discussed and it was eventually decided to ask the Committee to go into the question and report at the next meeting.

Irregularities of the Poncunnam Munsiff's Court.—Mr Kirk put the following resolutions before the meeting:—

1. That the Honorary Secretary write to the Poncunnam Munsiff and ask for an enquiry into the illegal arrest of a member of this Association.

2. That the Munsiff be requested to give notice to the Honorary Secretary of all days when Court will not be held at Poncunnam and that this notice be immediately posted in the Mundakayam T. B.

Seconded by Mr. Hamond. The Honorary Secretary was requested to take the matter up.

Local Registration of Labour.—Mr. Kirk's proposal regarding this was withdrawn, the papers being left on the table for information of members.

Memorial to the late Fred. H. Hall.—Mr. Kirk circulated a list for subscription to this and it was decided to also erect a memorial to the late R. A. Fraser. The memorials will take the form of two tablets suitably inscribed which will be placed in the Peermade Church. Mr. Kirk very kindly consented to carry the matter through, and it was consequently placed unreservedly in his hands.

The Scientific Officer Scheme.—Mr. Eyre proposed that Mr. Anstead be asked to become an Honorary Member of the Committee. This was seconded by Mr. Gudgeon and carried unanimously. The meeting then proceeded with the election of two members on the Committee in place of Mr. Danvers-Davy, Chairman and Ex-Officio member, and the late Mr. R. A. Fraser.

Mr. J. R. Vincent and Mr. Eric Hall were elected.

Date and Place of next Meeting.—Mr. Murphy very kindly placed his Bungalow at the disposal of the members. The meeting will take place on Saturday May 3rd, 1913.

Hearty votes of thanks to the Chairman, proposed by Mr. Hamond and to the Honorary Secretary, proposed by Mr. Eric Hall, were unanimously carried and the meeting then terminated.

(Signed) G. H. DANVERS-DAVY, *Chairman.*
(„) EDWIN VINCENT, *Hony. Secretary.*

SOILS.

Nitrogenous Soil Constituents and their Bearing on Soil Fertility.

The following is a summary in their own words of a Bulletin written by Messrs. O. Schreiner and J. J. Skinner issued by the Bureau of Soils of the U. S. Department of Agriculture.

A large number of organic compounds have been isolated from the soil covering a wide range of chemical substances. They are represented by Hydrocarbons, consisting of carbon and hydrogen only by oxygenated compounds like the acids, fats. resins, alcohols, esters and waxes, consisting of carbon hydrogen and oxygen. as well as by a large group of nitrogenous compounds that consist of carbon, hydrogen, oxygen, and nitrogen. These nitrogenous compounds contain the nitrogen combined in different forms, as for instance with carbon only, as the amino group NH_3, or as the imino group NH. Most of the compounds isolated from the soil are decomposition products of proteins, nucleo-proteins, nucleic acids, lecithins. and similar complex nitrogenous compounds of biological origin.

There can be little doubt that organic constituents of the soil or nutrient solution are absorbed directly by the roots of plants, and enter into the cells reacting with the cell contents and producing effects which differ according to the nature of the compound absorbed. The function through which plants absorb organic soil constituents is in every respect similar to that exhibited by plants with the mineral nutrients.

A plant is able to take in each cubic centimeter of water that it absorbs a greater concentration of minerals than is contained in the original solution with the result that the original culture of soil solution loses its mineral nutrients faster than it does its water. For this reason culture solutions must be frequently changed, and in the case of the soil solution in situ it must be resupplied by solution from the store of fertiliser elements in the soil or by movement of the solution itself, and possibly also by movement of the roots by growth into new territory. Not only does the absorbing power of the root enable the plant to take more nutrients per cubic centimeter of water absorbed than is contained in the same volume of the soil solution, but it also enables the plant to obtain a different ratio of the mineral nutrients for its use that exists in the nutrient solution. While the plant possesses the power to absorb more readily those constituents it needs in its metabolism, it is, nevertheless, not able to wholly exclude undesirable or useless constituents, and thus it happens that it even absorbs those which interfere with its growth and normal development.

This property of plants to absorb the mineral constituents from the soil solution is nowise different in respect to the soluble organic substances in the soil solution, and these organic substances produce various effects upon the plant absorbing them and in some cases they react with the protoplasm of the plant. There are many organic substances that exhibit no detrimental effect, but rather produce an increase in growth and altogether a better plant development. Such for instance are Creatine, Creatimine, Histidine, Arginine, Nucleic acid, Hypoxanthine, and Asparagine. The plants absorb and use such nitrogenous soil consituents as these whether nitrates are present in the soil or not, the effect on growth being much more marked when no nitrate is present, the compounds being directly absorbed and assimilated.

The soil compounds beneficial to growth are among the unit parts of which the complex constituents of every life cell are built; that is they are the units obtained when one of the complex proteins, nucleo-proteins, etc., are resolved into a simpler compound by chemical means. Take for instance a nucleo-protein. This complex can be split into a protein and a nucleic acid. The protein can be further split into a number of smaller units which are known as splitting products of protein or primary degradation products. These units or bricks out of which the complex structure of the protein is built comprise such compounds as histidine arginine, etc., and others still simpler in composition This process of taking the complex molecule apart into these units is accomplished by fairly simple means. To effect further decomposition of these units means more deep seated changes, an actual breaking up of the bricks themselves, as it were. In this process ammonia, acids, phenols, and the like are formed. In the soil as is well known the ammonia is again changed to nitrite and nitrate, and thus according to most authorities, the nitrogen cycle is completed and ready to start again on its mission of producing plant protein.

Let us also trace the "building down" of the nucleic acid, which was one of the component parts of the nucleo-protein used above as an illustration. Like the protein part, nucleic acid yields smaller parts or bricks. The unit bricks of the structure of nucleic acid comprise such compounds as hypoxanthine xanthine, guanine adenine, cytosine, pentose sugars, phosphoric acid, and others. All of these have been found in soils. Like the splitting products of the proteins, these compounds can and do suffer further decomposition in the soil, the nitrogen appearing first as ammonia then nitrite, and nitrate as before; but again these changes mean the breaking up of the unit bricks which composed the nucleic acid structure.

The proteins, nucleo-proteins, and nucleic acid are essential to all animal and vegetable growth. That the plant can build these compounds with nitrate and ammonia as the source, of the nitrogen has been definitely shown for a loug time. In the case of the animal it is just as certain that it cannot build up tissue with nitrate and ammonia as the source of nitrogen. The animal obtains its nitrogen for protein building from the organic nitrogen compounds of plants and other animals. Hence has arisen the popular conception that plants build up complex protein compounds from mineral salts, and from minerals salts only, that is, that plants differ fundamentally in their function from animals.

The animal in order to obtain the elements for building its own protein, resolves by the process of digestion the protein materials of ingested vegetable or animal food into the units or bricks above mentioned, and then builds out of these units its own protein. If, in a restricted diet, certain of these units are excluded, improper nutrition results. All of the units must be potentially in the food of the animal or be formed in the digestive tract.

While the plant is able to build up the complex protein substances in its tissues from nitrate and even ammonia, it does not make this complicated chemical transformation in one step. While this process is but little understood it is certain that there must be intermediate products, and that these are the same products as the degradation units above mentioned is more than probable. Many of these have been found in plant tissues as such. It seems logical therefore that if the plant absorbs such units of tissue building from the soil that it uses them just as if they were produced within the plant itself. Nitrate presents nitrogen in a highly oxidised form. The nitrogen in organic combination in the plant is always in a greatly reduced form. It follows that much energy can be expended otherwise, and hence plant efficiency is increased and growth augmented when the plant obtains compounds which will serve as tissue builders directly from the soil.

The results obtained in cultural work with such nitrogenous constituents lead to the suggestion that this theory is an explanation of their action when alone and in conjunction with nitrate, namely, that the compounds are absorbed as such and utilized directly for building up the proteins and the other complex nitrogenous constituents of vegetable material. It seems reasonable to suppose that the unit parts of the complex protein molecules, when presented to the plant, will be used by it in preference to expending energy on the nitrate to prepare these units. If a soil be liberally supplied with all these units it is conceivable that good plant growth will result even without nitrate. If only a limited amount or kind of the units be present the plant must have nitrate with which to supply the missing units.

In the light of this theory it is clear that a single compound or brick cannot be used to build the whole structure. Nitrate is therefore required for maximum effect, so that other compounds or units can be formed. It is, of course, conceivable and this conception forms part of this theory that the plants enzymes may be able to transform one of these units into other closely related units, such as for instances, the change from guanine to xanthine, as well as ammonium compounds. If, however, only a single compound or brick is supplied in the absence of other sources of nitrogen there should be a limit beyond which the plant can make no further use thereof. because of the fact that the entire protein structure cannot thus be built up. Such a limit is in fact proved by experiment.—R. D. A.

CORRESPONDENCE.

THE EDITOR,
The Planters' Chronicle.

Dear Sir,—Will experienced Tea Planters kindly say what is the defect in manufacture when the infusion in the cup opens out flat instead of preserving any of its twist? I think this results from error in withering, but no doubt from their greater experience some Tea Planter will kindly enlighten me.

Yours faithfully,
ENQUIRER.

RHODESIAN RUBBER.

Rhodesia is apparently to make a bid for a place in the rubber market. There is much of importance concerning minerals the output of gold was a record—agriculture, cotton and tobacco in the report of the British South African Company, but the paragraph that specially catches our eye is that relating to rubber. That Northern Rhodesia is rich in various species of rubber-producing vines, shrubs, and plants, we know, and the board is satisfied that the time has arrived when an outlay upon machinery for the extraction of rubber is fully justified. The rubber will not be obtained by purchase from native collectors ranging over wide areas of territory, but will be extracted by the company's own employees from the plants growing, and to be grown, on its properties. Operations will be commenced on an estate situated in a promising vinerubber area, but it is fully anticipated that the undertaking will be capable of considerable expansion. The African Lakes Corporation, Ltd., which has worked a certain amount of vine rubber successfully in Nyassaland, will give the B. S. A. Co. the benefit of its experience. We do not anticipate that the Rhodesian output will be very great, but rubber may be helpful as a source of revenue, and the experiment will be watched with interest.—*The Rubber World.*

The Planters' Chronicle.

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THE U. P. A. S. I.

(INCORPORATED.)

Contents.

We publish the Annual General Meeting of the South Travancore Planters' Association and as regards 'Labour' this Association is strongly opposed to any legislation at present.

We have been favoured with another very interesting letter from Mr. Harris on 'Explosives' as an aid to Agriculture. It will be noted that from the experiments witnessed by him he is of opinion that the cost given in his first letter of January 25th may be excessive. We hope that others will make experiments and give us the benefit of them. It is very pleasant to think that those who retire still take an interest in our industries and communicate widely their experiments. We wish others would do the same.

Green manuring has been so widely advocated in the first instance by Dr. Lehmann, the Agricultural Chemist of the Government of Mysore, and later strongly recommended by the Scientific Officer of this Association that any article tending to support their views must be of great interest to the Planting Community: so an article is reproduced.

Many members of the Planting Community go home so frequently now-a-days that that it will interest all—those who go and those who stay—that for a subscription of one pound they can have the use of a Reading and Writing Room at the Imperial Institute and can make use of the Government Library and Reading Room while at home. We publish the Government Notification on the subject and would draw our readers' special attention to it.

An interesting lecture by Dr. Chand'er on the "Economic of the Tea Trade" will interest Tea Planters.

We hope to welcome Mr. Anstead, Scientific Officer, back to Head-quarters by the end of the month. He will find the climate of Bangalore different to that of the High Range. Bangalore is at present one degree hotter than Madras which is 93. Bangalore 94.

A very useful table called The Bankers' and Merchants' Time Table has been received at the Office. It is most useful and effects and enormous saving of time for ascertaining the number of days between any two dates in a year, due dates, etc.. A useful adjunct to every office table.

DISTRICT PLANTERS' ASSOCIATIONS.

South Travancore Planters' Association.

Proceedings of the Annual General Meeting held at the Club in Quilon on Saturday, 22nd February, 1913.

PRESENT.—Mr. J. B. Cook (in the Chair), Messrs. R. Branson, L. G. Knight, J. H. Parkinson, C. Hall, H. S. K. Morrell, T. S. Jackson, and A. W. Leslie, (Honorary Secretary). *By Proxy*:—Messrs. J. Stewart and S. W. Sinclair.

In the absence of Mr. Stewart, Mr. J. B. Cook was voted to the chair.

Agenda Paper:—

1. Confirm Minutes of last meeting.
2. Chairman's Report for the past year.
3. Adoption of Accounts.
4. Report on the Sri-Mulam Assembly.
5. Mr. Cook's Resolution, *re* meetings of this Association.
6. Labour Legislation.
7. Cooly Rates.
8. Correspondence.
9. Election of Office-bearers for 1913,

The Minutes of the previous Meeting were read and confirmed. A letter was read from Mr. J. Stewart, the Chairman, regretting his inability to attend the meeting, and on retiring from the chair, thanked all members for the support they had given him in the past.

The next business was the adoption of the Accounts. A statement of these was read by the Honorary Secretary and passed.

Sri Mulam Assembly.—The following report was read by our representive Mr. J. B. Cook.

"Gentlemen,—As instructed I attended the Sri Mulam Popular Assembly as your Delegate. The first subject you asked me to bring forward, was the question of present Estate owners being allowed to take up say 30% of the amount of their properties at the upset price without its being put up to auction. The Dewan replied that as far as possible present holders would have the preference over adjoining lands, but that the Government could not bind itself by a special rule.

"With reference to the European Ward at Quilon, this has been sanctioned, and the Bacteriological Office there is to be converted into a ward for Europeans and later on when the Railway reaches Trivandrum it is probable that another ward will be built at the capital.

"The Kanan Devan Delegate brought forward a subject as to the undersirability of any addition to the existing labour laws. The Dewan asked the opinion of the Central Travancore Delegate and myself on this, I said I had no instructions from my Association, and was not sure of their views: but gave as my own private opinion that some further legislation will have to come sooner or later: not so much against the labourer as against ourselves. Mr. Westaway the Central Travancore Delegate agreed with me, but he, like myself, had no instructions from his Association on the matter."

It was proposed by Mr. J. B. Cook that fixed dates be arranged for the meetings of this Association *viz.*—The Annual General Meeting to be held on the last Saturday in January, and the Quarterly Meetings on the last Saturdays in April, July and October, this was carried after the following amendment by Mr. L. G. Knight "unless circumstances render postponement necessary."

Labour Legislation.—Read letter dated 12th November, 1912 from Honorary Secretary, Central Travancore Planters' Association. After some discussion and the reading of several letters from our members it was resolved that this Association be strongly opposed to any legislation at present.

Cooly Rates.—This matter having been discussed it was decided to leave it over for future meetings.

The following resolutions were brought forward by Mr. L. H. Knight and carried.

1. "That the British Resident be requested to supply this Association with copies of all the regulations relating to the import of Fire arms into Travancore and the licenses required to keep and transport arms into and out of Travancore and the licenses required (if any) to shoot game."

2. "That the authorities be requested to consider the great necessity of retaining a Police Station at Aryankavoo, as a serious robbery took place on Ambanaad Estate on the 15th of this month and for various reasons, the Police were not able to reach the estate till 54 hours after the occurrence of the robbery."

Election of Office-bearers.—The following were elected for the ensuing year:—

Mr. E. Lord as Chairman

Mr. H. C. Seymour as Honorary Secretary, with Messrs. L. G. Knight, R. Ross, and H. S. K. Morrell as a Committee.

The rate of subscription to the Association was fixed at the same figure as last year *viz.*, annas 3 per cultivated acre.

It was decided to leave over the election of a delegate for Bangalore until next meeting.

This being all the business, the meeting closed with a vote of thanks to the Chair.

(Signed) A. W. LESLIE,
Honorary Secretary.

A note in the *International Sugar Journal* for December 1912, states that the exports of sugar from Peru in 1909 amounted to 125,351 tons, value £1,159,899. Most of this sugar went to Chile, while the United Kingdom was the second largest customer.—*The Agricultural News.*

Aluminium nitride has been referred to already in this journal (*Agricultural News*, Vol. IX, p. 188) as a possible manure. In Engrais, 1912 p.577, a discussion is given of the production of this substance as a practical means of fixing the nitrogen of the air. It is indicated that aluminium nitride may become useful in agriculture on accoount of the fact that it contains about one-third of its weight of nitrogen and that it can be produced fairly cheaply.—*The Agricultural News.*

CORRESPONDENCE.

Explosives as an aid to Agriculture.

TO THE MANAGING EDITOR,
The Planters' Chronicle,
Bangalore.

Dear Sir,—In continuation of my letter published in your issue of 25th January, it may interest some of your readers if I give a brief account of some experiments I recently witnessed on a neighbour's property.

No. 1. A piece of ground was being levelled for the purpose of making tennis lawns. At one end a cutting of 2½ feet had to be made, and the earth carried along and put at the other end. Instead of cutting the earth by means of manual labour explosives were used, and I was assured that three cartridges were put into a hole made with a crowbar about 2½ feet deep, at intervals of about 6 feet either way, and the holes were filled with earth, and rammed down, a fuse attached to a cartridge being left about a foot out of the ground. This was lit, we retreated to a safe distance, and in about 2 minutes the explosion took place. The report was not so loud as I anticipated, and the earth was not thrown up any distance, but it was thoroughly disintegrated, and in a state to be easily shovelled into the wheelbarrow.

No. 2. The next objective was the stump of a fair young oak measuring 4 to 5 feet in circumference at the base—a rough trench had been made round the stump and some of the lateral roots cut to give access underground for the insertion of the explosive. The cartridges, amounting altogether to 1¼ lb. of cheddite, were packed tight in a tin (the greater the compression the more effective the explosion) and the tin was shoved into a hole as near the centre of the stump as could be reached. It was then rammed tight, the fuse lit. and in a minute or two the explosion occurred. The report was louder this time, there being more resistance, but nothing was thrown any distance—on inspection we found that half the stump was blown clean out of the ground, and the foundations of the remaining half so shaken that removal by hand was no longer a matter of much difficulty.

No. 3. We next tackled a large elm stump which must have measured 9 to 10 feet in circumference, and which required 3 separate explosions to effectually uproot it. For the first 1¾ lbs. of cheddite were rammed down, which blew a considerable portion out of the ground, and caused a general shattering—a second charge of about 1 lb. disposed of a good piece more, but a third was necessary, as what remained was still pretty firm in the ground. This was inserted in a very favourable position and in close contiguity to the stump itself. The result was a great commotion, chunks large and small flew in all directions, some 50 to 60 feet high, some to a distance of 30 or 40 yards. We had been inclined to think our host over cautious in insisting on our standing at what he considered a safe distance - this time we appreciated his care. The result of the experiments was pronounced very satisfactory, and the actual cost of the powder used said to be only about 3*s*. so it would look as if the estimate of cost given in my previous letter might be excessive. A few carefully conducted experiments would soon determine this. There is no doubt the work is most effectually done when explosives are used—and I think the system, in spite of cheap labour, might be resorted to in India in connection with some works with great advantage.

Yours faithfully,

27th February, 1912. J. A. HARRIS.

GREEN MANURING.

BY

G. D. HOPE, PH. D., B. SC., F. C. S.

AND

A. C. TUNSTALL, B. SC.

PART I.

The knowledge, use and value of green manuring have become so general and its results recognised as so beneficial that we have no hesitation in reproducing an article on the subject.

"Green manuring, that is, the growth of a crop not for the purpose of yielding a harvest, but in order to increase the fertility of land on which productive crops are also grown, either at the same time or in alternation with them, has been an important feature of agriculture for many hundreds of years.

It would be out of place here to go into the history of different methods of dealing with green manures, and we are concerned only with practical considerations bearing on their use.

Green crops are grown with two main objects :—

(*a*) to add organic matter to the soil,

(*b*) in the case of certain green crops to add nitrogen to the soil.

We will consider these in order :—

(*a*) The necessity for a supply of organic matter in the soil will be understood when it is explained that soil consists essentially of organic remains (chiefly of plants) mixed with weathered rock fragments, the whole being the medium for the activities of bacteria which, in their life processes, produce nutrient solutions which serve to support higher plant life.

No definite rule can be laid down as to the amount of organic matter that a soil should contain in order to be best suited to the requirements of tea bushes, for the amount of organic matter found in first class tea soils varies enormously. It is well known that healthy vigorous bushes can, and do, grow well, on the one hand in soils which contain as much as 60 per cent. or more of organic matter (bheel soils), and on the other in soils which contain as little as 3 per cent. and within these rough limits the amount of organic matter is no criterion of the quality of the soil. Speaking generally, however, bushes grow more vigorously and flush more readily the higher the percentage of organic matter in the soil, until a stage is reached at which they have a tendency to produce rank growth and poor quality of leaf, and are subject to blights. An example of this is afforded by tea growing in bheel soils. Those bushes which grow in soils deficient in organic matter are poor and stunted and lack vigour a condition which is probably detrimental to the quality of the leaf.

The general tendency of the soils of cultivated land is to lose organic matter. Virgin land covered with vegetations which is not cropped becomes richer in organic matter as plants grow and shed their leaves, branches, etc., but where plants are partially or whole removed annually and the soil is constantly cultivated, the amount of organic matter tends to decrease, and this particularly so in tropical and sub-tropical countries. When this reaches a stage at which the activity of soil bacteria is affected, the soil becomes less fertile, but addition of organic matter restores the lost fertility. It improves also the tilth, on the one hand of stiff clayey soils and on the other of sandy soils which are so light in character as to require something to enable the sand to bind, and it increases the power of the soil of retaining moisture, Organic matter can be supplied in the form of cattle manure, fish manure, oil cakes, and other organic manures; as jungle, either that which grows on the land itself or which is cut and carried from elsewhere; or as prunings; and the practical possibility of enriching the soil in respect of organic matter by these means should receive full consideration in cases where it is required.

Under present conditions cattle manure is difficult to obtain in quantities sufficient to treat large areas of ground, while oil cakes and other organic manures do not supply sufficient organic matter to really be of much value from this point of view when a considerable addition is necessary.

When a good crop of "jungle" springs up naturally after each round of hoeing and is buried in by the next round, this obviously affords a valuable means of adding organic matter to the soil. On gardens which are fortunate enough to be well supplied with labour the mistake is sometimes made of hoeing too frequently, with the result that practically no jungle is permitted to grow. This would be very well if the land were hoed with the object of keeping down jungle in order that a suitable green crop might grow instead, but it is usually done not with this purpose in view but because the opinion exists that hoeing cannot be over-done. This is a mistake. Consequently on such gardens the excessive cultivation tends to exhaust the soil rapidly and the estate is living on its capital.

The jungle bordering cultivated areas and that growing on the sides of nullahs and on tilas varies in character according to the nature of the soil and climate and often affords material which might probably be used for the same purpose. Suitable jungle often grows in nullahs in many gardens. While plantains and similar large-leaved plants too, often grow in, and bordering on, the tea area of gardens. In this connection also attention may be drawn to the weed *Eupatorium odoratum* (see the note on this plant in the present issue) and, to the *Artemizia* so common in the neighbourhood of Darjeeling gardens both of which might profitably be used in this way.

(*b*). The second aim of green-manuring is to enrich the soil in respect of nitrogen. Only certain leguminous plants are capable of doing this, for they alone have the root nodules, which harbour the species of bacteria which actually promote the fixation of nitrogen. Consequently serving as they do a double purpose, that of supplying organic matter and nitrogen, leguminous plants chiefly are used as green crops. There is no reason, however, why other crops should not be used and in some cases it may be desirable to grow them. The nitrogen which a soil acquires by the growth of a leguminous green crop is not fixed in amount and depends upon other things beside the actual weight and composition of the crop, for it must be remembered that the total nitrogen in the crop is the sum of that which is taken from the soil by the roots and of the atmospheric nitrogen which is fixed by the bacteria of the root nodules, and the proportions of the whole supplied from each source is not constant. If the soil contains so large a supply of available nitrogen that the plant can flourish without fixation of atmospheric nitrogen the root nodule bacteria become inoperative, and the nodules are few and small, yet the crop may be good. If on the other hand the soil is poor in nitrogen but is rich in other respects, large nodules develop, and the ultimate addition of atmospheric nitrogen to the soil may be considerable though the crop may be poorer than in the above instance. In some cases, however, the soil may be too poor to provide other constituents necessary to the plant such as potash, phosphates, etc., and a poor crop only is obtained and no opportunity is afforded of enriching the soil to any extent in respect of nitrogen.

An excellent opportunity is here afforded for the skilful use of manures. Treating the soil with a manure containing potash or phosphates and no nitrogen for the purpose of enriching the soil in respect of nitrogen may be a new idea to many, particularly to those whose only idea of manuring is to apply periodically the amount of nitrogen. phosphoric acid and potash which they calculate has been removed by the bushes since the previous application but the manuring of green crops and especially of such as are leguminous is an extremely sound method of promoting fertility of the soil.

As we have said above it is often the case that a soil is so poor in organic matter and its fertility so reduced that green manures will not grow, and often when we have had occasion to enquire whether green manuring has been carried out on gardens we have been informed that attempts to do so have ended in failure, though in many cases the desirability of replenishing the supply of organic matter has been fully recognised—in fact the failure of the green crop itself points to the infertile condition of the soil.

In such cases manuring of the green crop should be carried out. A two-fold benefit is derived from the use of artificial manures in conjunction with green crops. In the first place the growth of the latter is assisted and if it be a leguminous crop the fixation of nitrogen is also affected favourably if the manures used supply readily available potash and phosphates. There is also the reciprocal action of the green crop on the manure. The growth of a green crop tends to accelerate the decomposition of certain manures such as basic slag, bones, etc., and it is, therefore, an advantage to grow a green crop on the land on which such manures are being used. The plant takes up a certain percentage of the material provided by the manure, and when the crop is hoed in, this again becomes available to the bush within a short time. When soluable manures are applied to a green-crop the latter makes use of them, returning them to the soil again as it decomposes and thus preventing the waste which would occur if soluble manures had been employed without a green crop, when they would have run a great risk of being removed by rain. The net result, therefore, of manuring in this way is to produce a heavier crop and in the case of leguminous crops to promote a greater fixation of nitrogen. It also has the result that the availability of both soluble and insoluble manures is increased.

The actual choice of manures for this purpose should depend upon circumstances. If the production of a large amount of organic matter or of fixation of nitrogen be of the greatest importance, the manures should be chosen entirely to promote the production of a big crop. In the first instance nitrogenous manures in general should be applied, for they produce rapid growths of tissue and development of shoots and leaves. Consequently a bigger crop is obtained though other manures should also be used if the particular soil is known to require them. An example in illustration of the use of manures to promote fixation of nitrogen was afforded at Heeleaka where a noticeable increase in a crop of *mitti-kalai* was effected by the addition of potash to a mixture of manures. The efficacy of potash for this purpose has been observed in many countries, under many conditions, and in the case of different crops.

If on the cther hand an all-round scheme of treatment of the tea is being taken in hand including the use of manures, and occasional growth of a green crop. the manures could be chosen without reference to the requirements of the green crop, but advantage should be taken of their application to grow a green crop in conjunction with them.

The series of articles of which this is the first will deal with particular green crops in addition to discussing in further detail the general subject of green manuring."—*The Indian Tea Association, Scientific Department.*

GOVERNMENT NOTIFICATION.

International Association of Tropical Agriculture and Colonial Development.

FORMATION OF A BRITISH SECTION.

We have received from the Director of Agriculture, Madras, the following notification which may interest our readers:—

"The International Association of Tropical Agriculture and Colonial Development was founded at the close of the first International Congress of Tropical Agriculture held in Paris in 1905.

The object of the Association is the promotion of the scientific and practical study of all questions connected with tropical agriculture and the development and utilisation of the natural resources ot the Colonies. The President of the Association is Professor Wyndham Dunstan, LL.D., F.R.S., Director of the Imperial Institute, who was elected at the close of the International Congress, held in Brussels in May, 1910. The Association has its headquarters in Paris and is governed by an International Board, from which an Executive Committee of from five to seven administrators is selected.

The work of the Association is to promote investigation into questions of special importance to tropical agriculture, to publish the results of these enquiries, and to organise International Congresses for the discussion of the problems of Tropical Agriculture and Colonial Development. Two Congresses have ben held already and it is proposed to hold the third Congress in London in 1914.

A British Section of the International Association has now been formed, which will be responsible for the organisation of the Congress in London.

The work of the Association is not only of interest to departments of agriculture and forestry but also to planters and to merchants and manufacturers who are concerned with tropical and colonial raw materials, and it is hoped that all those interested in these important subjects throughout the Empire will join the British Section of the International Association.

The annual subscription for members of the British Section of the International Association is one pound, payable on the 1st January in each year.

Members of the British Section will have the privilege of taking part in the London Congress without further special payment. They will also receive all the publications of the International Association. In addition, the quarterly "Bulletin of the Imperial Institute" will be issued to them free of charge. A Reading and Writing Room will be reserved at the Imperial Institute for the use of members of the section when in London, and members will also be entitled to make use of the General Library and Reading Room of the Imperial Institute.

Subscriptions may be paid by crossed cheque or money order, payable to the Secretary, International Association of Tropical Agriculture and Colonial Development, British Section, and, in the case of money orders, should be drawn on the General Post Office, London.

Letters and subscriptions should be addressed to The Secretary, "British Section, International Association of Tropical Agriculture and Colonial Development," Imperial Institute London, S. W.,"

RUBBER.

(February 1, 1913)

A Boston Chemist on Synthetic Rubber

We have from time to time published articles on the question of Synthetic Rubber. Now we publish the opinion of a Boston Chemist of standing, who, though he believes that synthetic rubber is bound to arrive, believes also its competition will affect those now growing the natural rubber.

" Like most discussions that arise over the advance of science along the border-land which divides the known from the unknown, where the battle of progress continually rages, the discussion of the problem of synthetic rubber has its flood and its ebb, sometimes engrossing the attention of the scientific world, and sometimes lapsing into a condition of profound quiet. This has been the situation ever since Sir William Tilden, over thirty years ago, made the discovery that rubber could be made out of isoprene.

The synthetic discussion was renewed with great vigour last year by the disclosures made by Professor Perkin, of Manchester, England, in an address given before a body of scientists, showing what marked progress had been made in the solution of this problem by a group of English chemists on one hand, and another group of German chemists, both working independently and both arriving simultaneously at practically the same conclusion.

Dr. Lothan E. Weber, a Boston chemist of recognized authority in rubber circles, contributed a very interesting paper on this subject to the discussions held at the third International Rubber Conference which took place in New York last September. This paper is produced in full in this issue. Dr. Weber views the situation judicially and dispassionately. He is not disposed to join the chorus of chemists who proclaim that natural rubber—whether from the wilds of the Amazon or from the cultivated plantations of the East—will soon be given its *quietus* by the worker in the laboratory. He recognizes the great triumph of the chemical researches, in being able to produce rubber as good as comes from the South American forests, but he does not believe that they will be able—for years to come at least—to produce it on a scale that will seriously compete with natural rubber. He combats the theory of those who argue from the success of synthetic indigo to the success of synthetic rubber, showing that the two problems are totally different; stating that, while the producers of synthetic indigo had a perfectly definite task set before them, the composition of indigo being uniform and recognized, producers of synthetic rubber are compelled to work more or less in the dark, because the process of polymerization has not yet been brought under chemical control and is seriously lacking in uniformity; and he contends that synthetic rubber in commercial quantities will not be possible until the polymerization of isoprene is much more clearly understood than it is at present. While he thinks commercial synthetic rubber a possibility of the future, he does not believe that anyone now engaged in the rubber industry will see synthetic rubber in open competition with the natural product.

Ot course, the exact time when synthetic rubber will arrive at a commercial basis is only a matter of conjecture, but many competent observers will be greatly surprised if it does not do so within the lifetime of those now engaged in rubber activities. With the tremendous advances made in the solution of this problem during the last three or four years, it does not seem possible that its final success can be many years away.— *The India Rubber World.*

Effect of Tapping upon the Composition of Rubber.

Recently, samples of rubber prepared by different methods by the Ceylon Agricultural Department, have been sent to the Imperial Institute for examination, and the present article is based upon an account of this examination which appears in the *Bulletin of the Imperial Institute*, Vol. X, No. 3.

The tapping of the trees was performed (1) by the knife only (excision), (2) by the pricker only (incision), and (3) by a combined method, using both knife and pricker.

In the first series of experiments, the first specimen consisted of Pará crepe obtained by the use of the knife only, V and half spiral cuts being made. This rubber was light brown in colour and exhibited good elasticity and tenacity. It contained 94 per cent. of caoutchouc and a relatively low percentage of ash. It was valued in London at 4s. 6d. per lb. with fine hard Pará at 4s. 3d. per lb.

The second sample was Pará crepe obtained by V and half-spiral cuts with Bowman-Northway knife and pricker. This was thin crepe rubber varying in colour from light to dark-brown. The rubber exhibited very good elasticity and tenacity. It contained 94 per cent. of caoutchouc and relatively high percentage of ash. It was valued at the same price as the first sample.

The third was Pará crepe obtained by vertical cuts and Kelway Bamber's pricker. This was dark-brown, thin, crepe rubber, which was apparently not quite as strong as the two preceding specimens.

All the samples especially No. 3 prepared by making vertical cuts, were rather dark in colour for plantation crepe.

Specimen No. 4 of the second series consisted of rubber biscuits from trees tapped with the knife only. These were thin, light-coloured biscuits, clean and well prepared, but showing white surface marks. The elasticity and tenacity of the rubber were very good. It contained 91'6 per cent. of *caoutchouc*, and the amounts of resin, protein, and ash were somewhat high.

Sample No. 5 consisted of rubber biscuits from trees tapped with Bamber's pricker: thin light-brown biscuits, clean and well prepared; a few of the biscuits showed white surface marks. The physical properties of the rubber were very satisfactory. As regards composition this sample contained 92'1 per cent. of *caoutchouc* with rather high percentages of resin, protein, and ash, though the loss on washing was considerably lower than in the case of sample No. 4.

These two samples were valued at about 4s. 11d. per lb. in London, with fine hard Pará at 4*s*. 8*d*. per lb.

Following on the above information in the account already referred to, is a description of a chemical examination of rubber from *Manihot dichotoma*. This has been said to be superior to *M. Glaziovii*, the well-known Ceará rubber tree, as a source of commercial rubber. Recently some trees of *M. dichotoma* were tapped for the first time. The sample sent to the Imperial Institute consisted of four pieces of dark-brown, thick crepe rubber. Two of the pieces exhibited fairly good physical properties, but the other two were soft, sticky, and very weak. Rubber represented by the two best pieces of this sample would probably realize about 4s per lb. in London, with fine hard Pará at 4s. 3d. per lb. The rubber contained 84'6 per cent. of *caoutchouc*, and the percentages of resin, protein and ash were relatively high.

It is believed that this rubber was obtained from very young trees, and that the product may improve as the trees increase in age.—*The Agricultural News.*

TEA.

Economics of the Tea Trade.

The following lecture was delivered by Dr. Chandler on the Economics of the Tea Trade.

Dr. Chandler, at the outset, remarked that it was not his purpose to deal with matters relating to cultivation and manufacture in such detail as would interest planters only, but rather to discuss, so for as he was able, the general scientific principles which underlay the various processes, because they were obviously of fundamental importance to the planter, and therefore to the trade. There was quite good reason for believing that tea, in the first instance, was not used by the Chinese as a beverage so much as a medicine, valued, first of all, for its general stimulating qualities, and secondly for its value in treating certain disorders. Even in the second stage of the evolution of tea they found that the leaf prepared by special methods served virtually as a vegetable, as it did at the present day in Burma and the Shan States. It was not until the Chinese recognised the possibility of tea as a beverage that the cultivation of the plant in China became extensive, and that tea, as they knew it, came into existence. People qualified to inform stated that repeated reference in Chinese literature showed that tea cultivation was carried on at quite an early date on an extensive scale, and although if China was not the home of the tea plant, there was very good reason for supposing that it was the home of tea cultivation. It was commonly stated that China, with her enormous tea-drinking population, probably still remained and must remain, the greatest tea producing country in the world, in spite of the remarkable developments elsewhere ; but as there were positively no statistics upon which to base that statement, it would be quite useless to discuss the probabilities either for or against.

Turning to the practical, or what might be called the purely commercial side of the question, the total world's production of tea in 1912 amounted to 730,000,000 lbs., valued at approximately £18,200,000. The distribution of that enormous quantity to the tea principally tea consuming countries showed a per capital consumption of about 3 lbs. per head. The most recent official return of the tea consumption per head in the tea-consuming countries of the world was a White Paper issued by the Board of Trade in 1911, and which contained a most interesting summary of tea statistics. It was then estimated that the average world's consumption per head was about 2'73 lbs., but he had since been able to obtain further statistics which tended to raise that average in connection with which there were some noteworthy points. In the report of the Indian Tea Association for 1911-12 the following particulars were given : New Zealand, 7'4 lbs ; Canada, 4'3 lbs.; Holland, 2'1 lbs. South Africa, 1'2 lbs; Belgium (1911), 0.22 lbs.; Denmark, 0'9 lbs.; Germany, 0'1 lb. France, 0'7 lbs.; British Empire (excluding South Africa), 6'2 lbs.; English-speaking countries, 5'16 lbs. other countries, 0'63 lbs. The first point he wished to call attention to was the predominance of the British peoples as tea drinkers. Their consumption was tenfold that of foreign countries, *viz.*, 6'2 lbs. yer head, as compared with 0'63 lbs., excluding United States. Analysing the British figures, it was to be noted that New Zealand had headed the list, with a consumption 7'4 lbs. per head, and South Africa was last with 1'2 lbs. Holland headed the list of the continental tea-drinking countries, which was in part explained by the fact that she possessed a tea-producing colony in the East Indies. It was a matter for great surprise that

Russia, which was commonly supposed to be a great tea-consuming nation, only consumed 1 lb. per head per annum. Great tea drinkers they were, but they were certainly not great tea consumers, except among the upper classes, which was due to the relative poverty of the great mass of the people. In the case of the latter, the tea was first of all taken very weak and the leaves were used over again, hence the amount consumed was not great. It was a remarkable fact, well known to the India, Ceylon and Chines growers that exports to Russia largely depended upon the Russian harvest; good harvests meant large imports of tea. Nevertheless, the Russian market was a most valuable one, on account of its immense population, and was eagerly sought after by more than one tea-producing country. In the United States the consumption per head was slowly but steadily rising. Germany was not a tea-drinking country, and France was still less so. The consumption of tea in the United Kingdom in 1912 was estimated at 293,500,000 lbs.; Russia, 148,597,000 lbs; United States, 102,654,000 lbs.; Canada, 38,000.000 lbs.; Australia, 34,000,000 lbs.: the lowest amount recorded being that of Denmark, which was 1,069,000 lbs. It had been estimated that every year the natural increase in the demand for tea would necessitate the annual planting up of something like 20,000 acres, which was an impossibility, owing to the scarcity and high cost of labour in the tea-growing countries, and the extra demand was in a large measure met by increasing the productivity of existing gardens.

HISTORY AND DEVELOPMENT.

Dr. Chandler then briefly traced the history and development of the tea industry from the year 1800 up to 1912, and then proceeded to discuss the question of cultivation and manufacture. He said that there was no need to emphasise the importance of a thorough knowledge of the scientific principles underlying the methods of any industry, whether agricultural or not; but he might be permitted to remark that there were few agricultural industries in which such a knowledge was more necessary than in the case of tea. This was abundantly proved by the success of the Indian and Ceylon industries, at the expense of the Chinese, so far as external markets were concerned, and in regard to the Indian industry, it was freely admitted that the Indian Government and the planting community generally would have been saved vast expense had they had a better knowledge of the botany of the tea plant earlier. It had been stated that much of the disasters which overtook the Indian Industry in its early years was to be attributed to the improper and rule-of-thumb methods, both in cultivation and manufactue. It was, therefore, desirable that one should have a good grasp of the principles upon which the various methods of cultivation and manufacture, were founded. Although what he had said was quite true in regard to the past history of the Indian tea trade, one must be, however, quick in adding that quite remarkable knowledge and forethought were exhibited at the present time in the tea industry, whether in India, Ceylon, or Java. Both Ceylon and Java, to a very large extent were benefitting from the experience of India, and the work done both by and for the Indian planter came out in the fact that, whereas in 1873 the average yield per acre of tea in Assam was about 270 lbs., at the present time the average yield was in the neighbourhood of 500 lbs. per acre, while the tea produced was of a better quality; so that an enormous amount of scientific work. whether consciously or unconsciously, must have been done. In this connection one must pay a tribute to the Indian Tea Association, which had worked both scientifically and commercially in its endeavours to improve the quality of tea wherever it was grown.—*Home and Colonial Mail.—The Indian Planters' Gazette and Sporting News.*

The Planters' Chronicle.

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(INCORPORATED.)

Contents.

Mr. Anstead, Scientific Officer, has returned from his tour looking all the better for his trip to the High Range.

The Coorg Planters' Association is to be congratulated in that the Government of India are contributing to the Scientific Assistant Officer Fund, thereby recognising the importance of Science, initiated by the Mysore and Coorg Planters.

Portions of an interesting lecture by Dr. Chandler on the importance of caffein in Tea are a summary on experiments on the Tackiness of Rubber is reproduced.

A valuable paper on coffee by Messrs. Tattock and Thomand should prove of interest to Coffee Planters in Southern India. especially the table which accompanies it, comparing as it does, Costa Rica, Mysore, East India and Mocha coffees.

The sharp fall in coffee prices is attributable to political and financial unrest, a London Coffee Return to February 15th is published.

For those who send cuttings over long distances a simple method for preserving them is produced and should be made use of.

An interesting article on Chlorosis in Plants is reproduced.

With the use of explosives as an aid to agriculture becoming so prominent, an article on Dynamite in Tea Planting should prove of interest.

As Basic Slag is so much used a paper on its solubility by John Hughes F.I.C., is printed as interesting.

Mr. Guy Owen of Messrs, Sanderson & Co., has written to say that he is very pleased to accept the appointment of Representative of the United Planters' Association of Southern India at the Chamber of Commerce.

Mr. Sanderson writes to the Secretary as follows:—

"Please convey to the Association my thanks for their very courteous expression of my past services and assure them it has been a great pleasure and honour to represent them on the Chamber during the past (about) 25 years."

DISTRICT PLANTERS' ASSOCIATIONS.

Coorg Planters' Association.

Proceedings of a Meeting held in the Bamboo Club, Pollibetta, on Thursday, March 20th, 1913.

PRESENT.—Messrs. Breithaupt, Garrett, Newberry, Mahon, Shaw, Gerrard, Pechell, Hume, W. R. Wright, Macrae, Bracken, C. E. Murray-Ansley, (President) and W. M. Ball, (Honorary Seceretary).

The Honorary Secretary read the notice calling the Meeting and, for the information of those who had not already seen it, the note on "Railway Communication with Coorg" kindly forwarded by Sir Hugh Daly, K.C.I.E., C.S.I., Chief Commissioner of Coorg. Mr. Ball proposed and Mr. Mahon seconded a hearty vote of thanks to the Chief Commissioner for the interest he has shown in this matter of Railways in Coorg.—Carried *nem. con.*

Proposed by Mr. Bracken and seconded by Mr. Wright "That a Sub-Committee consisting of Messrs. Garrett, Mahon, and Macrae with the President and the Honoraray Secretary be appointed to collect such statistics as may be of use to Mr. E. A. S. Bell, Chief Engineer for Railway Construction to the Mysore Durbar.—Carried.

Proposed by Mr. Ball seconded by Mr. Garrett "That a Sub-Committee of the following be formed for the purpose of revising the rules of the Association and to report at the Annual Meeting, Messrs. Shaw, Hume and Gerrard.—Carried.

Mr. Breithaupt brought up the subject of the Pollibetta Post Office being reduced to a 3rd class.

Resolved "That a further protest be made."

Read letter from the Commissioner of Coorg in answer to the Honorary Secretary's letter of the 14th February saying "that intimation of outbreaks of plague or other epidemics will be given to you and to all Superintendents of Estates in the immediate neighbourhood of the outbreak, and that Arrack and Toddy shops in the localities affected are, as a rule, closed for such a period as is considered desirable."—Noted with thanks.

Read letter from the Commissioner of Coorg saying "That the Government of India have been pleased to sanction an annual grant of Rs.1,500 for a period of 5 years to the Scientific Officer's Assistant Fund."

Resolved "That the hearty thanks of the Association be given to the Chief Commissioner and the Commissioner of Coorg for the interest they have shown and the trouble they have taken in this matter and that the Commissioner be asked to convey the thanks of the Association to the Government of India."

Messrs. G. A. Parsons and H. Hammond were elected members of the Association.

(Signed) W. M. BALL,

Honorary Secretary.

TEA.

The Market Points of Tea.

THE IMPORTANCE OF CAFFEINE.

Dr. Chandler's lecture on the Economics of the Tea Trade at the London School of Economic and Political Science, on Tuesdáy last, dealt with many points important to the planter and to the dealer, and, of course, ultimately to the public. Referring to the manuring of the tea estate he pointed out that the increases in the products of estates consequent upon manuring did not, of course, represent always equivalent additional profits, because the cost of the manures and their application had to be taken into account. In the practice of green manuring, certain biological processes had been taken advantage of by planters which were well-known in regard to other crops. All these facts pointed to the conclusion that thorough methods of manuring resulted in greatly improved crops, which meant an accompanying, but not necessarily proportionate, increased monetary return. With regard to the manufacture of tea, he pointed out that no methods of manufacture would make a high-grade tea from a low-grade leaf but bad methods of manufacture would spoil a good leaf. The leading market points upon which the quality of a tea liquor was judged were: Flavour, pungency, colour, and body. Flavour resulted from the presence in exceedingly small quantities of an essential oil, the product of fermentation. Pungency was caused in the greatest measure by the unfermented (unoxidised) tannin present. Colour was chiefly caused by fermented (oxidised) tannin. Body depended principally upon the total soluble matter, which could be extracted and made up in larger part of the tannin, fermented and unfermented.

Dr. Chandler then remarked that two facts stood out strongly in regard to these "market points." One was the importance of the much abused tannin. The tea expert regarded as the finest teas, and priced them accordingly, those which contained the highest percentage of tannin. An analysis of a common Ceylon tea showed tannin present 5·40 per cent. in the cup, while in high priced Ceylon tea there was present 7·50 per cent. It would be seen from the tannin relationships of pungency and colour that a vital point in tea manufacture would be how far the fermentation of the tannin was to be allowed to go. If the oxidisation were carried to completion or excess pungency would suffer, and if not carried far enough the colour would be at fault. It was always a question, and a matter of experience, how far pungency was to be sacrificed to colour. The second point was the absence of any reference to caffeine. It was to this substance, which was a poisonous alkaloid, present also in coffee. cola, and, in small quantities, in cocoa, etc., that the stimulating effect of tea was due. It was the most important medicinal constituent; but, curiously enough, the tea expert took no conscious account whatever of the caffeine-content when judging the value of a tea, and the prices of two samples of tea would have little or no relation to a caffeine-content. It was true that the highest-priced teas were, in general, from the youngest leaves contained much more caffeine than much older leaves; but these teas were selected for character other than caffeine-content. Personally, he had always suspected something of a vicious circle in this contention. and recent researches by the "Lancet" indicated a most interesting relationship between caffeine and tanning as factors influencing tea prices.—*The Rubber World.*

RUBBER.

Tackiness of Rubber.

Some useful experiments dealing with tackiness carried out by Mr. K. Gorter, and published in "Mededeelingenover Rubber" Java, are admirably summarised by the *Bulletin* of the Imperial Institute, as follows:—"He (K. Gorter) points out that the best qualities of Hevea rubber show little tendency to become tacky. He criticises the view that bacteria cause tackiness on the grounds that: (1) It is not infectious, at any rate the infection proceeds very slowly and is incapable of detection; (2) rubbers coagulated in presence of antiseptics or by boiling are just as likely to become tacky as rubber prepared in other ways; (3) light, which is generally inimical to bacterial action, favours tackiness. He admits, however, that substances produced by bacteria may bring about tackiness, acids, such as sulphuric, being known to favour the change. Gorter finds that prolonged heat at 60 C. may cause rubber to become tacky, and that rubber which had been dissolved in benzene and re-precipitated is liable to the same change. He found that a solution of rubber in benzene diminished rapidly in viscosity on exposure to strong sunlight, whereas in the dark it remained fairly constant. By evaporation of the solution of rubber which had been exposed to light, a residue was obtained which had all the properties of tacky rubber. He concludes that the tackiness of rubber is due to a physical change such as the change from amorphous to crystalline tin. On continuing his experiments, however, (Mededeeling No. 2), he found that rubber solutions exposed to the light eventually deposited a gelatinous precipitate. This precipitate, after washing by decantation, gave a yellow colouration with a titanium sulphate and liberated iodine from potassium iodide, but on shaking with an ethereal solution of chromic acid no blue colour was produced in the either layer. He, therefore, concludes that an organic peroxide is formed, and elementary analysis of the precipitate gave results agreeing with the formula $C_{10}H_{16}O_5$. He next exposed rubber to light in atmospheres of air, oxygen, hydrogen, and carbon dioxide, and found that whereas in the last two cases the rubber retained its elasticity, in an atmosphere of air or oxygen it became very tacky, with absorption of 3 per cent. by weight of oxygen. Even the absorption of 0·6 per cent. by weight of oxygen produced considerable stickiness, which he thinks explains why previous observers have failed to notice any increase in weight when rubber became tacky. Carrying out the experiments in an apparatus in which he could measure the rate of absorption of oxygen, he finds that this is at first slow, but becomes more rapid as oxidation proceeds. He thinks from the reactions of the product that levulinic acid is produced when rubber becomes tacky. He concludes finally that tackiness is due to definite condittions favouring oxidation, such as heat, light, and the presence of certain chemical substances. He finds tacky rubbers have a high ash content, and manganese is always present; but seeing that manganese is also present in the ash of the best quality of Hevea rubbers, he thinks that manganese alone is not responsible for tackiness, but may be active in conjunction with other substances. In support of this view he cites the observation of Euler (Zeitsch. f. physiol. Chem. 1908. 57, 80) that the oxidation of hydroquinone by light is greatly accelerated by solutions of Rochelle salt or sodium citrate containing manganese. This view is also in harmony with the apparently universal occurrence of manganese in the ash of oxidases (Bertrand, Bach, and others.)"—*The Rubber World*,

COFFEE.

There is no Tannin in Coffee.

Such is the Conclusion of R. R. Tatlock and R. R. Thom. and from Elaborate Analysis of Composition of Coffee.

It might be thought from the volume of literature on coffee, that the subject had been dealt with sufficiently to serve all purposes for the detection of adulteration in the former article. But when we examine the literature in this connection it is clear that there is something to be done in improving and, if possible, in shortening the methods of analysis, and above all revising and correcting data which are obviously unreliable. It is in this direction that we propose to go in the present paper.

In making analyses of coffee. the data generally relied upon to determine the genuineness, or otherwise, of coffee are the mineral matter soluble and insoluble in water, and the specific gravity of a 10 per cent extract of the sample. or the percentage of extract yielded by boiling a weighed portion of the sample repeatedly with water until exhausted. An item generally omitted is the caffeine, but since the introduction of "coffee freed from caffeine" it seems to be necessary that the percentage of this alkaloid should be determined, as the article referred to cannot be regarded, and is not sold, as genuine coffee, seeing the caffeine has been abstracted, which is certainly not allowed by Section 9 of the Food and Drugs Act, 1875 of United Kingdom.

Caffeine.—The methods given in text books for the estimation of this alkaloid are either unreliable or tedeious and elaborate; but the following simple and rapid process, which we devised and have employed for several years, supplies the want. Boil 6 grams of the coffee with 600c.c. of water for two hours, under a reflux condenser, cool, filter of 500c.c. of the solution (equal to 5 grams of the coffee), evaporate the filterate to about 40c.c. in bulk, cool, add 10c.c. of normal caustic soda or ammonia, and transfer to a separator, washing in with as little water as possible, which need not be more than 10c.c. respectively; collect these together in a clean separator and shake up, first with 10c.c. of normal caustic soda, and then with 10c.c. of water, in order to remove all traces of colouring matter. etc. Distill off the chloroform, dry at 100c., and weigh the caffeine. If the caffeine is coloured it may be dissolved in a little dilute casutic soda, and extracted again with chloroform: if the process is carefully carried out this is not necessary.

Water Extract and Specific Gravity of Extract.—The methods generally given for the determination of water extract in coffee or tea, and especially in the latter case, do not appear to give consistent results, too much being allowed to depend on chance. The instructions are to boil with repeated quantities of water till coloring matter ceases to come out, but we do not find this method to give quite consistent results, so we can recommend the following as always giving results within less than half a per cent; boil 1 gram of the sample with 400c.c. of water under a reflux condenser for one hour, collect the insoluble matter on a weighed filter, wash two or three times with boiling water, dry at 100 c., and weigh. Traces of oil contained in the coffee may be left in the flask in which the boiling is conducted, and if this is the case it may be dissolved in either, evaporated, weighed, and added to the insoluble matter contained in the weighed filter. All that now requires to be done is to add together the insoluble in water and the water, and subtract the sum from 100, when the difference will represent the water extract, In the annexed table we have recorded analyses of well-known varieties of coffee, roasted and unroasted, also of a well-known brand of "coffee freed from caffeine." In addition to the caffeine and water extract, we have also given other data, among which are the specific gravity of a 10 per cent. extract, the ash soluble and insoluble in water, the silica, and the oil extracted by petroleum spirit. These need only be referred to, as they were estimated in the usual way. The dextrose stated in the analyses is simply the copper-reducing power, toward Fehling's solution, of the sample without any preliminary treatment to clarify or decolorize the coffee or chicory solution. The moisture was estimated by drying 5 grams of the sample at 100 c. until no further loss in weight was observed. Two hours generally sufficed for this, but if the heating was prolonged after the maximum loss, the sample began to gain in weight.

Analysis of Coffee, per cent. in Sample Dried at 100 C.

	Costa Rica.			Mysore.		East India roasted.	Mocha roasted.	Coffee freed from caffeine.
	Raw.	Roasted.	Roasted.	Raw.	Roasted.			
Caffeine ...	1·22	1·20	1·38	1·18	1·25	1·46	1·19	0·08
Water extract ...	30·80	30·26	30·77	31·02	29·06	29·10	30·76	27·42
Ash soluble in water ...	3·06	2·96	3·21	3·01	3·15	3·32	3·14	3·30
Total mineral water, less silica	3·83	3·84	4·19	5·94	4·11	4·29	3·99	4·31
Silica (chiefly) Sand ...	Trace	Trace	Trace	Trace	Trace	Trace	Trace	Trace
Oil	14·26	12·48	12·96	11·90	12·01	12·90	14·04	13·12
Tannin ...	3·75	None	None	None	None	None	None	None
Specific gravity of 10% extract..	...	1·0102	1·0099	...	1·0102	1·0101	1·0102	1·0101
Copper reducing as dextrose ...	...	·60	...	...	·62	...	...	...
Moisture originally present ...	8·24	5·50	2.20	10·87	6·68	3·10	5·74	1·22

Having dealt with the methods employed in testing coffee, we have now to deal with the results of analysis as bearing on the genuineness, or otherwise, of any sample submitted to the analyst, and for this purpose we refer to the table. From our experience, the water extract, taken singly, is the most reliable of all, as the variations observed in different coffees are not so great as shown by any of the other ingredients, so that it gives the best basis for the calculation of percentage of adulteration, once the fact of adulteration has been approved. It may be held that the specific gravity of the 10 per cent. extract gives quite good results, but these are more variable than the water extract, and the former are dependent, to some extent, on the fineness of the particles of the ground coffee, a condition which does not influence the latter method of testing. As a basis of calculation, 30 per cent of water extract in coffee and 75 per cent in chicory, both taken on the sample dried at 100c., may be assumed where admixture with chicory is proved. The further proofs absolutely necessary are the percentage of caffeine and the mineral matter, including the proportions of soluble and insoluble in water, as well as the silica. If, in a sample, the caffeine falls materially below 1·2 per cent., while the other items just referred to come out practically normal, then the presumption is that the article in question is coffee freed from caffeine, or a mixture of that with genuine coffee. In this case an opinion must be based on the percentage of caffeine found, and the sample may be described as deficient in caffeine, or as coffee from which caffeine has been abstracted, to the extent found. This is the case with what is now advertised as " Lifebelt " coffee, but it will be observed that the water extract is fully 1¼ per cent. lower than the lowest of the genuine coffees. Of course, this difference is too small to make one positive that anything has been removed, but the large deficiency in caffeine proves this, and also shows, when the other figures are taken into account, that little more than caffeine has been extracted.

Such, briefly stated, are the conclusions we should arrive at in certain circumstances. It is necessary, however, to deal with recorded results of coffee analyses. In different text books as low as 0·5 per cent. of caffeine is stated to be present in genuine coffee, but we are quite satisfied that this alkaloid does not fall materially below 1·2 per cent. in any coffee. The low results need not be assigned to inaccuracy on the part of the analyst, but probably to the methods of analysis employed, most of which required very careful manipulation to obtain anything like reliable results. So far as our experience goes, the percentage of caffeine in coffee procured in this country (England) lies between 1·19 and 1·46 per cent. on the dry sample. These figures are purposely given in our table, because they are the lowest and highest we have found after making a very large number of analyses. It should be stated, however, that since our results were obtained, Lendrich and Nottbohm have reported as high as 2·95 per cent., of caffeine in roasted African coffee. but the finding of such an exceptional percentage of alkaloid would not point to tampering with the article, supposing the other constituents were in order.

The water extract as stated in our table also gives the lowest and highest found, and it will be observed that the range is very limited. These results are considerably higher than those (from 21·5 to 26·5) per cent generally given, and cannot be accounted for by the mere difference of method of treatment.

The ash soluble and insoluble in water are much as stated by Allen, and the old extracted by petroleum spirit is higher than is generally given (10 to 12 per cent. in coffee and 1 per cent. in chicory).

The only other point to which reference may be made is as to whether coffee contains tannin or not. In one of the most recent books on " Food Analysis " there is an elaborate process given for the determination of tannin in roasted coffee, this being dependent on a 48 hours' fermentation of the coffee after soaking with water, then extraction with alcohol, and final precipitation as tennate of lead in the alcoholic solution. How this distinguishes tannin from coloring matters it is difficult to understand, so that a definition of the former term is required. In our view tannin is a substance which will tan the skin or hide of animals, that is, a body that will be fixed by or combine with the nitrogenous bodies contained in that article, and under the proper conditions should the precipitable by gelatin and certain alkaloids, such as quinine and cinchonine. Now, the so-called tannin or caffetannic acid of roasted coffee has no such properties, so that it cannot be regarded as a real tannin. We have found, however, that unroasted or raw coffee does contain a genuine tannin to the extent of about 4·5 per cent. This was estimated by precipitation with quinine sulphate, a process which we have successfully applied to the estimation of tannin in tea, and which has been corroborated by Lowenthal's volumetric process. From these results it seems clear that although tannin exists in the raw coffee it is destroyed during the roasting. In the foregoing statement about tannin in roasted coffee, we have the support of Prof. Proctor in his recent book on "Leather Industries," 1908, where he says that "certain bodies (caffetannic acid, etc.) have been described as tannins, but do not precipitate gelatin or tan hide and are more closely related 'to the coloring matters' than the tannin." As far as we are aware, the presence of tannin in the sense which we have described, in raw coffee has not been previously noted.

We append the results of the examination of the fixed oil, that is, oil not volatile at 100 c., extracted from raw and roasted coffee, respectively, as regard some of the constants :—

	Oil from Raw Coffee.	Oil from Roasted Coffee.
Iodine value per cent. ...	99·00	99·00
Saponification value per cent. ...	17·95	17·95
Unsaponifiable matter ...	5·26	5·51
Specific gravity at 15 c. ...	...	·9354

It will be observed that the constants for the oil contained in roasted and unroasted coffee are practically the same, and that the unsaponifiable matter is higher than that generally found in vegetable oils. The iodine value of the unsaponifiable matter was found to be 171·7, which seems to point to the presence of a heavy resinous oil. (Simmon's Spice Mill, February, 1913).

Coffee

Heavy sales have been made in the terminal market at steadily falling prices, but as early sellers have desired to close their contracts, there has been an occasional advance, the final rates being only 2*s*. 6*d*. per cwt. under last week's. The political and financial unrest in many parts of the world, and in addition the failure of a rather large dealer in Havre, have been the apparent causes of the sharp fall. Dealers generally expect lower rates during the coming season, and have mostly, therefore, refrained from buying. The decline in the terminal market has of necessity been reflected to some extent at the auctions, where heavier arrivals of new crop Costa Rica have been offered in larger quantities than are needed for immediate consumption. Prices have in consequence given way about 2*s*. for the finer grades and as much as 5*s*. for common sorts, and at the lower level there is much more inclination to buy. Probably as soon as it is realised that rates are now as low or lower than they have been twelve months, more business will be done, and as stocks are, by no means, heavy even a moderate demand may easily lead to a recovery.

LONDON COFEE RETURNS.

	Home Consumption.		Export.		Stock.	
	1913	1912	1913	1912	1913	1912
For week ended Feb. 15 ...	Tons 284	Tons 423	Tons 314	Tons 387	Tons 10,762	Tons 10,881
For 7 weeks ended Feb. 15...	1,839	2,047	1,734	2,526	...	...

—*The Produce Market Review.*

SELECTED CUTTINGS.

Keeping soft cuttings alive for long periods.

By GEORGE W. OLIVER, *Plant Breeder and Propagator, Office of Foreign Seed and Plant Introduction.*

It has often been found desirable to bring soft or herbaceous plant cuttings from long distances, but the difficulty heretofore attending their transportation has been that the cuttings do not remain in good condition longer than a day or two. This difficulty has been removed by an exceedingly simple contrivance.

Dormant hard-wooded cuttings and scions can be sent long distances by mail, as was demonstrated a few years ago in a collection of scions and bud sticks forwarded to Mr. William. S. Lyon, at that time in the service of the Government of the Philippine Islands. Not only did the material reach its destination in good condition, but some of it was repacked according to instructions and returned to Washington, where it was successfully grafted in the Greenhouses of the Department of Agriculture.

Soft or herbaceous cuttings, on the other hand, such as those of alfalfa, clover, and many other plants, cannot be sent long distances by Mail or Express, but they will survive a journey of six weeks in perfect condition if kept where they can be given light occasionally and attention is paid to supplying the water lost through evaporation. This treatment in the case of alfalfa and many other plants induces healthy root action during a journey of several weeks' duration.

The apparatus for successfully bringing cuttings of herbaceous plants from distant places is of the simplest nature. The necessary articles are a small quantity of living sphagnum moss, two sheets of strong glass, 5 by 7 inches or larger, and some string. The cuttings should be prepared in much the same way as though intended to be placed in a propagating bed.

Arrange the first layer of cuttings without too much crowding and with the upper surfaces of the leaves on the first piece of glass and on top of the cuttings, and place about 2 or 3 inches of living sphagnum evenly distributed over the cuttings. Place another layer of cuttings on top of this moss, with the under surfaces of the leaves next to the moss, so that all the available space will be covered. and on top of this second layer of cuttings place the second piece of glass. Press down firmly, remove the moss which protrudes beyond the edges of the glass, and tie together with stout twine.

The package now consists of two pieces of glass, 2 inches of pressed sphagnum moss, and two layers of cuttings. one between each piece of glass and the moss. By keeping the moss moist and giving all the light possible (direct sunlight is best, and it does not raise the temperature of the moss to an appreciable extent beyond that of the surrounding atmosphere), the cuttings are not in least injured, provided the material is free from fungus troubles. If the journey is long enough, say, of four to six weeks' duration, cuttings such as those of clover. alfalfa, doryonium, lotus. and many other plants will have rooted freely while closely pressed against the glass. During the time of rooting no attention is required beyond keeping the moss wet and exposing the cuttings to the light for a few hours each day.

With the moss only slightly dampened, scions and bud sticks of rare plants keep a very long time in good condition under the same treatment. (*U. S. Dept. of Agrl: Misc: Papers, Bureau of Plant Industry, Cir. No. 111*).

Chlorosis in Plants.

An abstract of a paper by P. Maze, Rust and Lemoigne, on "Chlorosis in Plants induced by Carbonate of Lime," is contained in the *Bulletin of the Bureau of Agricultural Intelligence and of Plant Diseases* for October, 1912.

In a previous number of this *Bulletin* (January 1912), reference was made to experimental work by Maze on the "Chlorosis of Maize," when it was pointed out that this yellowing of the leaves does not indicate a pathological condition but is physiological, resulting from very varied influences. The author was, however, able to certify that the absence of sulphur or iron, *per se*, is able to cause chlorosis in maize. Chlorosis has been generally attributed to the want of iron, and this has usually been remedied by the addition of the sulphate of iron. The response to this treatment suggested the question as to whether the cause is not the lack of sulphur rather than the lack of iron.

It is well-known that calcareous soils play an important part in producing chlorosis in certain plants, and Maze showed that the desulphuration of the soil through the formation of insoluble calcium sulphate as one of the causes of chlorosis.

Consequent on this, the three investigators referred to above have conducted wider enquiries into the cause of chlorosis as manifested in lime soils generally.

Vicia narbonensis was grown successfully in water cultures containing all the essential elements for proper nutrition. The solution contained no carbonates. When, however, calcium carbonate was added to the culture solution at the rate of 2 per thousand, the plants became regularly chlorotic after producing half a dozen normal leaves. Drops of a solution of ferric nitrate at 0·2 per thousand deposited on the discoloured leaves caused the appearance of chlorophyll after three days. Magnesium sulphate does not exert any action on this chlorosis. It is, therefore, the calcium carbonate that has produced the chlorosis by the withdrawl of iron.

The explanation of these facts is as follows:—In the solution supplied with the calcium carbonate, the iron is made entirely insoluble. Certain plants like maize possesses the property of absorbing it by means of the acid secretion of their roots (malic acid in maize). Other plants like lupin or *V. narbonensis* are incapable of utilising the unavailable iron and hence become chlorotic. A similar incapacity on the part of the sugar-cane may possibly explain the presence of unproductive patches in cultivated fields, such as these in Antigua, (where they are called 'gall patches', particularly since these affected areas are, in the special instance mentioned, confined to the limestone districts of the island. —*The Agricultral News.*

The export trade in cocoanuts has been almost destroyed by a disease in Cuba, which has attacked the palms, so that the number exported has fallen in three years from 10,000,000 to 4,000,000 so reports Mr. Vice-Consul Cowan. A cocoanut oil mill at Baracoa, which formerly worked day and night, now operates only two days a week. The Commission which has been considering the disease appears to be of opinion that nothing can uproot the disease except the destruction of all the infected palms. As it takes five years for a cocoanut palm to come into bearing, the industry must for some time suffer eclipse.—*Tropical Life.*

Dynamite in Tea Planting.

With regard to the articles which have recently appeared in our columns on the use of explosives in planting, a well-known Nuwara Eliya Planter writes:—"What I want to know is, in employing explosives for tea land, do we have to use them in every place where we want a hole? If so, it will work out very expensive, I am afraid, at 3,000 holes to the acre." The main object in using explosives in agriculture is to break up and fissure the subsoil, to bring it in contact with the air and warmth, to regulate moisture, and to make the valuable plant food in the subsoil available to growing crops. In the cultivation of field crops, or in tree planting, these conditions are necessary if the beneficial results of intensive agriculture are to be secured by the cultivator. In the matter of planting trees that grow to large proportions, like rubber, cocoanuts, cacao, and fruit trees, explosives are of considerable value, for, besides breaking up the subsoil and making it loose and friable, the explosions form cavities at the bore holes, or in any case loosens the soil so that it can be easily removed with a shovel. to allow of trees being planted in them. In the case of trees which are planted close, like tea, there is no necessity to fire a charge in every place a plant is to be put down. In the United States of America, where dynamite has been used in agriculture for some time now, such field crops, like maize, which are planted very much closer apart than tea, are raised over considerable areas of dynamited land with good and profitable results. In tea cultivation after the firing of the charges in the field has broken up the subsoil and hard pan, where such exists, the plants may be put down in the usual way, and in the shattered soil the roots will soon come in contact with the food end nourishment made available. Messrs. Curtis and Harvey, the well-known manufacturers of explosives, give the following particulars about the quantity of explosive to be used:—

Depth of hole.			Charge.
2 feet	...	...	1½ oz.
3 ,,	...	...	2 ,,
3½ ,,	...	...	3 ,,
4 ,,	...	...	4 ,,
5 ,,	...	...	6 ,,
6 ,,	...	...	8 ,,
7 ,,	...	...	11 ,,
8 ,,	...	...	16 ,,

"By the firing of the shot the ground should be loosened to a distance from the hole equal to about twice its depth. That is to say, for a hole 2 ft. deep over a circle of 4 ft. radius, the result of the shot can best be ascertained by digging down a verticle section through a hole. A cavity the size of a man's head will be found at the original position of the charge, and from this cracks will be found radiating in all directions. The distance to which these cracks extend effectively is the radius of the charge. If this radius is much less than twice the depth is too great. if much more the charge is too heavy. The distance so determined is the radius of the shot, and holes should be put down at double this radius." In very wet ground it will be necessary to sink charges below 4 ft.. otherwise this depth is exceptional.—*The Weekly Times of Ceylon.*

We are indebted to the columns of the *Ceylon Observer* for the following extract:—

The Solubility of Basic Slag.

(By John Hughes, F. I. C).

In a paper on "Basic Superphosphate," read by the writer in April 1901, before the London Section of the Society of Chemical Industry, it was pointed out that the statement that ordinary basic slag contained 20 per cent. of free caustic lime was obviously incorrect, because such an excess of lime would indicate wasteful method of manufacture, for lime was only added in sufficient quantity to remove the phosphorus and silica existing in the original from ore.

It was further mentioned that probably 2 or 3 per cent. was the utmost caustic lime usually present in commercial basic slag. Recent investigation by the writer tends to indicate that the existence of caustic lime, even in small proportion, exerts a most important influence in rendering the slag soluble in the 2 per cent. solution of citric acid, which, under the provisions of the Fertilisers and Feeding Stuffs Act, 1906, has been prescribed as the standard solvent for this material.

In the following analyses the figures represent the general composition, also the relative solubility in the above solvent:—

GENERAL COMPOSITION.

	No. 1.	No. 2.	No. 3.	No. 4.
Fine powder passed through standard sieve 10,000 holes to square inch	90'89	75'74	70'92	96'15
Total lime	51'85	48'10	46'45	41'97
Phosphoric acid	19'45	17'90	18'80	10'95
Oxides of iron, Manganese, Magnesia, etc.	23'75	27'20	37'45	30'07
Insoluble Silicious matters ...	4'97	7'80	7'30	17'01
	100'00	100'00	100'00	100'00
Equal to Phosphate of lime ...	42'46	39'08	41'04	23'91
Containing Caustic lime ...	3'66	2'50	1'43	0'22

Solubility in 2 per cent. Citric acid solution after agitation in bottle for half-an-hour.

	No. 1.	No. 2.	No. 3.	No. 4.
Soluble lime	42'77	40'76	37'52	26'12
Soluble Phosphoric acid	15'60	16'55	16'30	1'80
Equal to Phosphate of lime ...	34'05	36'13	35'58	3'93

It will be noticed that fine grinding *alone* does not ensure future solubility, for sample 4, which is the finest ground, shows *lowest* solubility; while sample 3, which is the coarsest powder, shows a very high solubility.

It is interesting to notice that the citric solution, though it fails to dissolve much of the phosphoric acid in No. 4, dissolves a very considerable proportion of lime, namely, 26'12 per cent. which probably explains why basic slag which yields a low solubility of phosphoric acid, nevertheless, supply a relatively large quantity of lime in a very finely divided state, and consequently if applied to soils devident in lime and decidedly damp and sour, may produce a very satisfactory improvement in the pasture at a relatively *small cost.*

It might be contended that the solubility might be due to the relatively high proportion of lime associated with a low proportion of silica; but such is not the case, for a sample containing 18'20 per cent. of silica and only 39'99 per cent. of lime showed a solubility of 35'36 phosphate of lime, though the grading was only 77'12.

It seems, indeed, quite natural that the presence of caustic lime causes the minute fragments of the slag to burst on the absorption of moisture, and thus mechanically materially promotes the subsequent solvent action of the citric solution, and that when caustic lime is not present the solvent action is very much less effective (79, Mark Lane, London, E. C. *Chemical News*, 24th January.)—*The Indian Planters' Gazette and Sporting News.*

The Planters' Chronicle.

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THE U. P. A. S. I.

(INCORPORATED.)

Contents.

We are sorry to report that Lecanium Viride or Green Bug has appeared on a couple of estates near Saklaspur: and although every effort is being made, we hope with success, to stamp out the disease, under the capable supervision of Mr. Frattini, Scientific Assistant (Mysore), still Mr. Anstead, our Scientific Officer, has decided to visit and inspect these estates himself, and lend the aid of his more extended experience and advice to his assistant. He will not probably be away more than a week, but he feels it is of the greatest importance that he should make a personal inspection of the infected areas. This disease having once put in an appearance in Mysore, it is incumbent on every Manager of a Coffee Estate to provide himself with one, if not more, knapsack sprayers to check the fell disease from the very beginning. No estate should be without one.

The Scientific Officer in this issue commences a report of his tour in the High Range, which is so interesting that it awakens a desire for more, which we trust will not be interrupted by his enforced, but very necessary visit to those infected estates near Saklaspur.

We are only able to publish a portion of the Proceedings of the Anamalai Planters' Association this week. The remainder will appear in next week's issue.

We are indebted to the *Bureau of Plant Industry* for a very interesting article on "Soil Bacteriology" as a factor in crop production which only increases our admiration towards those Scientific Agricultural Chemists who have set themselves to solve some of the wonders of nature. From no agriculturists can that tribute to them be witheld.

Lately from this Office some notices have been issued on behalf of Mr. Krumbiegel, Economic Botanist to the Government of Mysore, inviting application for fruit trees from Australia. It is to be hoped that advantage will be taken of this offer and that application will speedily be made. The larger the quantity ordered the cost will be much less.

Scientific Officer's Papers.

CXVII.—REPORT ON A TOUR IN TRAVANCORE HIGH RANGE.

From the 1st to 23rd of March I made a tour in the Travancore High Range. This was my first visit to this district and, thanks to the excellent arrangements made for me by the Honorary Secretary of the Kanan Devan Planters' Association and the transport facilities kindly afforded me by Mr. H. L. Pinches, I was able to see all the typical parts of the district and visit a large number of Estates.

The local conditions vary very considerably, and estates range from an elevation of 6,000 to 2,500 feet with an annual rainfall ranging from about 300 to 70 inches. A large number of crops are grown: the chief staple is Tea, but in addition to this Cardamoms are cultivated in the jungle, there is some Coffee, and a little Chinchona, while crops such as Camphor, Sisal, and Coca are being grown more or less experimentally. At the lower elevations there is a certain amount of Rubber, both Hevea and Ceará, and Fuel Trees are cultivated to a large extent.

Two types of land are planted; jungle which is naturally the best, and grass land, the latter being found to produce good Tea and to be suited to Fuel Trees, Sisal &c.

There are a large number of very interesting problems to be dealt with, and at two meetings of the District Planters' Association called while I was there I was able to discuss some of them in detail. In this Report I propose to deal with the more important of the problems of general interest somewhat at length.

TEA.

CULTIVATION, SOIL MANAGEMENT, AND MANURING PROBLEMS.

A number of different types of soil are to be found in the district, but all are soils of a loose friable texture which in the dry weather become very powdery. This causes one of the most outstanding difficulties, namely "dry wash". Much of the land planted in Tea is very steep and the slopes are at, or even beyond the 'angle of repose' for the soil in a dry state, and consequently the least disturbance causes the surface soil to slide down. The passage of the coolies plucking and weeding sets large quantities of it slipping down the slopes, and even the wind sets it in motion. The consequence is all the drains rapidly become blocked up, the roads are covered with soil, and each year when the rains come many tons of valuable soil are carried away in the rivers and lost.

This is all the more important since it is the surface soil which is denuded in this way. It is well-known that the fertility of a soil depends to a very large extent upon the process of nitrification going on in it. This nitrification is an oxidation process carried out by the agency of soil bacteria and the presence of air is necessary. Consequently the upper layers of the soil are the most fertile where the air can easily penetrate, and it is in these upper layers that the nitrifying bacteria are most plentiful and active. About 65% of the total nitrification occurs in the upper twelve inches of soil and little takes place below three feet depth. For this reason surface soils alone are highly fertile, and in the case of dry wash it is this valuable surface layer with its bacteria and readily available plant food which is constantly being lost. Tea is a deep-rooted plant, but its deep roots serve the purpose of supplying the plant with water more than anything else, and it feeds chiefly by means of its surface roots in the upper layers of the soil.

Many remedies have been suggested. In some places which I visited contour drains were being dug in new clearings with the object of saving the soil. This is an expensive method and of limited value. A system of clean weeding is almost universally adopted in the district and this helps to increase the dry wash. I would advise experimental trials of the following methods of prevention. First of all the sickling of weeds on steep slopes so as to leave as many roots in the soil as possible to hold it up. In connection with this a special weed, a leguminous one for preference, of a close growing habit such as *Desmodium triflorum*, might be established and left. Attempts to do this have been made in some places, and the weed used for the purpose has generally been a clover like plant with a yellow flower, *Oxalis corniculata*, while *Cassia mimosoides* had been tried in another place. At the time of my visit it was difficult to find weeds of any kind, but probably there are many suitable for the purpose. The great objection to this method of control is the presence of leeches in the wet weather. It is possible, however, that leeches might be exterminated if it were worth while.

Some use might be made of the prunings, laying these across the slopes in alternate lines, or burying them with the brush part sticking out of the ground, with the object of holding up the soil and gradually forming natural terraces, and in connection with this I would suggest that, despite its obvious inconvenience, on steep slopes the tea should be originally lined along the contours across the slope instead of up and down it.

The problem is of sufficient importance to warrant experiment with these suggested methods on a large scale, and unless something is done to stop dry wash the life of the tea must be limited as will be shown when we come to the subject of manuring.

Cultivation and digging on slopes is to be deprecated and the soil should be left alone as much as possible. Where cultivation becomes necessary it will probably be better to apply manure rather than to dig in this particular type of soil.

Taking the district as a whole the tea has not yet been manured in any way and I found that most planters were anxious to know when this would become necessary or if it ever would. With the constant drain of surface soil the time is undoubtedly bound to come when it will be neceassry to apply manure if the present high yields per acre are to be maintained, and I should expect the tops of the slopes and the ridges from which the soil is most rapidly denuded to show the need of manures first.

What then are the first signs by means of which deterioration of tea may be recognised? The loss in yield is usually not the first sign, for this can often be maintained by closer plucking after deterioration has already set in. The first noticeable thing is as a rule the change in colour of the bushes. A healthy tea plant, growing vigorously, has a darker appearance than an unhealthy plant, and the leaves have what may be described for want of a better word an 'oily' appearance. At the beginning of the season the *whole surface* of healthy tea is growing, each shoot even in the outer parts of the bushes throws out a new growth which is vigorous and has oily looking dark green leaves. If the general colour of the tea is yellowish, if the difference in growth vigour at the outside of the bushes and in their centres is marked, if the shoots cease to grow and turn banjhi, then these are signs of decline and want of plant food in the soil. Tea showing these signs of decline is usually attacked by Red Rust and this is again a sign of all round weakness.

The appearance of the wood as well as the leaves and growth should also be watched. Nearly all the tea bushes have lichens and moss on their stems but these only occupy a part of the surface; and it may be stated here that such growths are *not* parasites; they do not enter the tissues of the tea or take anything from the tea bush. They use the stems of the tea merely as a support and convenient resting place and they are known botanically as *epiphytes* in contradistinction to parasites and the utmost harm that they do is to partly choke the breathing pores of the bark, and if fungoid diseases are present act as places where spores can collect. These epiphytic growths will be found on most tea bushes, but they occupy only a *part* of the surface of the stems, but in unhealthy plants they spread over the *whole* surface of the stem giving the wood a white or greyish appearance which is generally described as 'hide-bound.' In this case too the leaf growth ceases to a large extent except from the younger wood at the top of the bushes, making the bush appear hollow. The wood is thin and whippy and white instead of thick, vigorous, and red.

These then are the most obvious signs of unhealthy deteriorating tea and when they are seen, one of two things has happened, either the bush is worn out or the soil is exhausted owing to incorrect treatment or lack of plant food, and the first thing to do is to make sure that the soil is in a good enough condition to enable the bushes to respond to treatment.

In the case of the soils in this district drainage and tilth are likely to be good owing to its natural friable nature, and in all probability if the signs described above appear in the tea it is plant food which is lacking.

When we come to consider the manurial requirements of tea in any particular soil it should be studied experimentally first on comparatively small areas. The first step to take before these experiments are begun is to have a chemical and mechanical analysis of the soil made upon which to base a manurial scheme, and it may not be out of place here to say a word or two about soil analyses in general.

When the relation of potash, phosphoric acid, and nitrogen more particularly to the growing plant was first discovered it was thought that the chemist had only to make an analysis of the soil to be able to make up a manurial formula, and this being applied any crop could be grown at will. It was quickly discovered, however, that the case was not so simple and that many factors came into play, some very difficult, and others almost, if not quite, impossible to determine in the laboratory. Of recent years the important part which micro-organisms play in the soil and their bearing upon fertility has been discovered, and so the value of soil analyses has gradually been diminished until it is in danger of being altogether overlooked. Though a soil analysis cannot solve all the problems of manuring, nevertheless, it is of very great help when devising a manurial system and it more often than not indicates the broad lines upon which experiments can best be carried out.

I strongly advise, therefore, any planter who thinks that his tea may be nearing the time when it is advisable to apply manures to it to have analyses of his soils made and forward them to the Scientific Department for advice as to the kind of experiments to try.

No general rules can be laid down for manuring, but it may be safely said that where the deterioration is in growth and luxuriance the most important plant food is usually organic matter and nitrogen, while if deterioration in quality is noticeable phosphoric acid is generally the remedy.

(To be continued.)

RUDOLPH D. ANSTEAD,
Planting Expert.

DISTRICT PLANTERS' ASSOCIATIONS.

Anamalai Planters' Association.

Proceedings of the Tenth Annual General Meeting of the Anamalai Planters' Association, held at the Kalianapandal Bungalow at 2 p.m., on Thursday, 27th February, 1913.

1. *The Chairman's Address and Annual Report.*

Gentlemen,— It is usual at this Meeting for your Chairman to address you on the work that the General Committee has been carrying on for you during the past year—but as you have been fully informed, from our printed proceedings, of what has, from time to time, taken place—it is only necessary for me to draw your attention to a few of the more important subjects that are of general interest to us all.

Hospital.—It will be remembered that at our last Annual General Meeting held on the 12th of February, 1912 a Sub-Committee (consisting of Messrs. Duncan, Marsh and Simcock) was appointed to consider which block of land should be reserved for future public buildings and recreation ground; and that they were unanimous in recommending that a block of land, consisting of some 200 or 300 acres, now known as the "old" hospital site should be secured for this purpose. This is the block of land that was approved of for a hospital by both Mr. Gillman (the Collector at the time) and Major Long (the District Medical Officer) but when later on it was inspected by Mr. Hemmingway (our acting Collector), he pointed out that the site did not meet with his approval, as the land was surrounded by jungle—and it would be impossible to get a Medical Officer to live there alone by himself. He, at the same time, suggested a new site between Valparai and Monica—pointing out that this need only be a temporary place and that the hospital should be so constructed that it could be removed to the original site—whenever a township was started. The subject was gone into by us on 17th June, 1912 and although it was recognised that the site selected by Mr. Hemmingway was not in the least central for the district, and of very small area, in extent, yet it was thought best to fall in with his views especially as there was, no doubt, that it might have been difficult to get a Medical Officer to live all alone on the site selected by us. Also that it was possible if we did not agree to the acting Collector's proposal it might delay matters and we might not eventually get a hospital at all.

Now, I gathered unofficially a short time ago, when in Coimbatore that it was possible that not only a Post Office but also a Travellers' Bungalow might be built by Government at a very early date. Now, Gentlemen, if there is any truth in this rumour, we should surely and strongly urge that they be built together with the hospital on the original site as selected by the planters themselves. I believe that we are all agreed that this spot is the most central (uncultivated area) for the district, as a whole, and that the future main road of the district will either pass right throught this block that we have selected for a township, or in any case within a hundred yards of it. If several buildings are constructed simultaneously, it would at once do away with its one and only drawback—*i.e. isolation.* There has unfortunately, or as it turns out possible fortunately, been delay, in doing much work—beyond a little felling on the new hospital site selected by Mr. Hemmingway, and I understand it is considered most unsafe to do any burning on the felled area before the rains have set in, so that no building operations can possibly be commenced anyhow until after the monsoon, even if then, which seems to me all the more reason why the original site as selected by us should be reverted to. In the meantime our position with regard to our contribution towards the cost of the up-keep of the hospital is a very ambiguous one; for, we cannot very well subscribe to something that does not exist!! and the point also comes in as to, if the original site, as selected by the planters, is not adhered to, whether the guarantors of the fund are still liable for their subscription? The subject, Gentlemen, is a most important one to the district, which must be my excuse for going so fully into it and I would earnestly beg of you to give the matter your most serious consideration at this meeting.

Roads.—The up-keep of all the D. P. W. branch bandy-roads and bridle paths have been taken up, as from the 1st of January last, by the planters who are mostly interested in them, and I trust that this scheme may be beneficial to the district in general. It is to be given a year's trial and if successful will be continued.

Access to New Estates.—Several lines have been suggested, but I believe the owners of the new grants on the south of the Nadivar are unanimous in their opinion, that there are only two possible outlets. One *via* the Castlecroft Estate and the other *via* the "old" hospital site—whichever route is decided upon, it will at once turn to Paralai—Castlecroft branch bandy-road, anyhow, as far as the 4th mile—into the main road of the district, and for its whole length, if the Castlecroft estate line is taken. The line to be adopted should not be definitely decided upon, Gentlemen, until the various traces have been completed; but the matter should be gone into at this meeting, for, it is of a very urgent nature, to all the new applicants, who must have a line of communication with the Government road as soon as possible. And whilst on this subject it might be as well for me to draw your attention to the Boards' Proceedings. Forest No. 182 dated 15th October, 1912 informing the planters that "they must make their own arrangements to obtain access to the main routes of communication and that Government's aid, in case of compulsory acquisition, can be rendered only under certain specified conditions." It is true, Gentlemen, that we quite understand that Government was under no obligation to *cut* roads for us to our new applications; but that they should give us no *right-of-way* or access to same, seems to be absolutely preposterous and absurd. The question is what are we to do? I suggest that we address Government direct on the subject, as it appears to me our position has not been properly explained to them. I do not think it has been sufficiently clearly pointed out, that in many cases, Government bridle-paths actually extend to the new applications, and that no further rights-of-way will be required in these cases, that all we ask for is that Government reserve outlets for us where this is not the case—and that we belive in almost every—if not every—case, rights-of-way can be secured, on unfelled land, the majority, if not all of which, has only recently been granted to the planters, on the distinct understanding that the said "grants are subject to the reservation of areas for such purposes, (*i.e.*, public buildings, general convenience) the areas of the land thus reserved, being deducted from the areas granted."—*Vide* D. F. O.'s letter dated 22-1-12 No. 585/sub. of 10. I have brought this before you, as it seems to me very important and that the matter should be dealt with at the same time as we are dealing with "Access to New Estates."

Checking of Fertiliser Guarantees.—The Scientific Department of the U.P.A.S.I, undertook at their last Annual Meeting to verify the guaranteed analysis of manures sold by the different firms. I have myself so far sent three samples of manures to be checked by the Planting Expert with the following results:—

Description of Manure.	Guaranteed Analyses.	Actual Analysis.
Sulphate of Potash ...	48—50% pure Potash	48·72
Concentrated Superphospates..	42—45% Phosporic acid	44·31
The following Mixture— 25 tons of Fish 5 tons Neem Poonac	4·82 Nitrogen 3·33 Phosphoric acid	4·18 Nitrogen 61·21 Organic matter. 4·59 Phosphoric acid. 24·14 Sand.

It will, therefore, be seen that the guarantees so far as Sulphate of Potash and concentrated Superphosphates have been well maintained and that in the case of the *Mixture* the Nitrogen was short but that the shortage was well made up by the excess of Phosphoric Acid. The point, however, about this last analysis is, the large percentage of sand; which shows I have had to transport the whole way from Calicut to the Estate 24% of absolutely useless seashore sand. I think, under the circumstances, we should try and insist upon the suppliers guaranteeing a limited amount of sand. I know our Planting Expert is all for this, and I believe the matter only requires pressing to gain what we desire. All the manures were supplied by Messrs. Peirce, Leslie & Co., Ltd.

I trust you will not think I have intruded upon your time by bringing these analyses to your notice. They should, I think, be of great interest and value to the whole planting community.

The Cooly shelters on the Ghat Road have not yet been started and it looks as if another monsoon will pass without those very necessary buildings having been provided.

We, months ago, selected Mr. Duncan as our *Magistrate for the District* but I am not aware that Government has appointed him yet.

Brake Logs on Carts.—The Acting District Forest Officer suggested to me the other day that we got printed passes for this purpose and it seems quite reasonable that we fall in with his request.

Post Office for the District.—Our Honorary Secretary informs me that his letters to the Postmaster-General on this subject have merely been acknowledged; but in view of the fact that it is contemplated building a Post Office, it appears to me possible that the subject is being dealt with by the heads of the Revenue and Postal Departments direct, and I would suggest that our Honorary Secretary write to the Collector asking him if this is the case, and if not, to request the Collector to very kindly use his influence with the Postal Department to get a Post Office constructed at a very early date.

Labour.—You all know that at the U. P. A. S. I. Annual Meeting your delegates agreed to pay the higher rate of subscription to our parent Association, tentatively for one year on the distinct understanding that some united action as regards labour problems be brought forward and adopted at the next Annual Meeting. From what is being recorded in the *Planters' Chronicle* there seems little chance of this being done—and if this is not done it then remains for you to decide if we shall not do better by reverting to our old subscription to our parent Association and using the difference in the subscription, in some way beneficial to our own labour troubles.

The Wire Rope-way and Electric Scheme.—Is on the Agenda paper and should be carefully gone into—it may make the very greatest difference to our transport in the future.

I now beg to place my resignation in your hands and in doing so, I have to thank our Honorary Secetary and our Committee for so willingly helping me in carrying out my duties as your Chairman during the past year.

(Signed). G. A. MARSH.

(*To be continued.*)

SELECTED CUTTINGS.

Soil Bacteriology as a Factor in Crop Production.

BY KARL F. KELLERMAN, *Physiologist in Charge of Soil-Bacteriolegy and Plant Nutrition Investigations.*

IMPORTANCE OF SOIL BACTERIOLOGY.

This day and generation are in the grasp of the invisible; the things infinitesimal, the things minute. The physician and the engineer have learned that they can battle with the complex conditions of to-day only by understanding a wealth of microscopic detail that formerly would have been considered ridiculous. These two professions have now joined with biology in recognising the microscope as a necessity. It is not surprising, therefore, that the most important profession in the world, that of farming, should awaken to the desire of comprehending and controlling the tremendous although imperceptible forces which may enrich or ruin fields and crops.

It no longer thrills an audience to say that soil is a living thing; it is either a trite remark, a common place relegated to the shelves as uninteresting, or it is a statement quoted impressively to explain everything in soil fertility. Both attitudes are unfair to this new science. Real progress is slow, and there are good reasons for asking the farmer to maintain a deep interest in the unseen population of the fields and to beware of dogmatic explanations unsupported by properly marshalled facts. The average mind is more than willing to believe a fairy tale, but unquestioning belief in hasty conclusions is more injurious to future progress than temporary lack of interest or appreciation.

Most readers of modern agricultural literature are familiar with the generalization that but for the various agents of decay the world would, in a very short time, become uninhabitable. It is through the constant disintegration and decay of dead plants and animals that fertile soils are regenerated and that the processes of growth of plants and animals can continue. Only during the last half century has the science of bacteriology shown how remarkable is this transmutation of the dead plants and animals back to soil. Bacteria themselves are plants. They form the simplest group of the fungi, or plants that are lacking in chlorophyll. They are exceedingly minute; the majority are not more than one one-hundred-thousandth of an inch in diameter, and it is believed that some bacteria exist which are too small to be seen even with the aid of the most powerful microscope. In spite of their small size, however, they are concerned with every phase of our daily life and by their incredible numbers and ceaseless activity overcome their apparent insignificance. Bacteria cause diseases, make milk sour, and in many ways are most troublesome. In spite of the evil that some species of this group of plants cause, however, other species, and even some of the troublesome species, under different conditions, are beneficial.

CLASSES OF SOIL BACTERIA.

The bacteria of the soil are chiefly of the beneficial types. They occur in almost infinite numbers, a fertile soil having from 15,000,000 to 300,000,000 to the ounce. Their functions and value are variable, both because the kinds of bacteria differ in soils and because any given species may vary physiologically within certain limits according to environmental conditions. The moisture, the temperature, the degree of pulverization, the rock formation, or the geological history of the soil, the aeration, the drainage etc., are all factors which partly determine the action of soil bacteria; and perhaps more important than any of these limiting conditions is the effect of one kind of organism upon those with which it is closely associated, or more broadly speaking, the effect of the associative or competitive action of the various groups of micro-organisms which act and react upon each other.

In outlining briefly the relation of soil bacteriology to crop production it is simpler to consider the subject from the standpoint of the bacteriologist and refer to groups of organisms more or less well-known that perform different functions in maintaing the fertility of farm soils. These groups taken in their entirety include practically all of the known types of decomposition and synthesis which take place in the soil. They include organisms which produce hydrogen-sulphid gas, indol, mercaptan, and other substances of this character whose importance in agriculture has yet to be demonstrated and need not be considered at this time. The chief groups and the order in which they will be discussed are the carbohydrate fermenters, which change starch, sugar, cellulose, etc.; the ammonifiers, which decompose nitrogenous compounds and form ammonia; the nitrifiers, which oxidize ammonia to nitrite and nitrite to nitrate; the denitrifiers, which reduce nitrate to nitrite and sometimes to free nitrogen gas; and the nitrogen fixers, which " fix " or combine the free nitrogen gas of the air with other substances to form proteids.

CARBOHYDRATE-FERMENTING BACTERIA.

The group of organisms fermenting carbohydrates, such as sugar, starch, and especially cellulose, which is the substance forming the firm or fibrous portions of plants, has many representatives, but their functions and their relations to crop plants are in most cases not well understood. It is known, of course, that many species of bacteria will ferment the different sugars, forming some organic acid and frequently carbon dioxid and hydrogen or carbon dioxid and methane. It is highly probable that the constant production of these gases, in minute quantities it is true in the chemically powerful condition of the nascent or freshly liberated gas exerts a much greater influence in soil weathering and the solution of plant food from small particles of minerals than any of the much-discussed agencies of the plant roots themselves. Both the carbon dioxid and the organic acids produced by these organisms are presumed to be of importance in controlling the availability of phosphates. No satisfactory methods of controlling this action have been developed, however, and no accurate estimate of this function has been possible.

The most resistant carbohydrate found in the soil and the type of carbohydrate which is most important because of the enormous quantities added to soils annually is plant fibre or cellulose. This is a substance so resistant to even moderately strong acids and alkalis that it appears at first glance almost indestructible. Obviously, however, active agents for cellulose destruction must be constantly operating; the decay of wheat stubble, of cornstalks, and of green manure turned under, as well as the rapid rotting of dead trees, are perhaps the best illustrations of this. It should be noted that humus has long been recognised as an essential constituent of a fertile soil, and more recently it has become apparent that many of the processes constantly going on in the soil which result in the formation of available plant food are controlled in a large measure by the quantity and quality of the humus compounds. In the formation of these compounds the cellulose, which is decomposed in the soil in such large quantities, must play a prominent role.

Extensive studies in our laboratory during the past two years have shown that there are numerous organisms endowed with the power of actively fermenting cellulose. The cellulose is made soluble and becomes available as carbohydrate food for other organisms, especially the nitrogen fixers, which will be referred to later. There is another phase of cellulose destruction which appears to be of great economic importance from the soil-fertility standpoint; and that is the action of filamentous fungi. Several investigators from time to time have found one or more species of molds to which they have attributed the power to dissolve cellulose, but no systematic attempt has been made to determine the extent of this phase of cellulose destruction. It appears, however, that cellulose destruction by molds is as important, if not more important, than its destruction by bacteria. There are at least 75 species of cellulose-destroying molds representing a large number of genera, including such common forms as *Aspergillus*, *Fusarium*, and *Penicillium*, which is the green mold so often seen on fruit and moist hay. The enormous quantity of cellulose available in the soil and the tremendous energy that can be developed by bacteria in breaking up the cellulose into simpler ferments make it seem at least possible that the maintenance of a high degree of fertility depends more upon the presence in the soil of the proper flora for decomposing the cellulose than upon the existence of any group. It should be remembered that this accumulation of carbohydrate food the source of energy for so many soil processes, is due to the fact that chlorophyll, the green colouring matter of the leaves of plants, in some manner as yet unexplained, enables the plants to absorb the carbon dioxid of the atmosphere and to utilize the energy of the sunlight to transform this carbon dioxid and the water of the plant sap into carbohydrates. The synthesis of carbohydrates is logically the most fundamental question of plant physiology, for this great quantity of potential energy is chiefly responsible for the continuance of plant and animal life.

AMMONIA FORMING BACTERIA.

There are many species of bacteria very widely distributed in nature which break down proteid compounds, forming ammonia together with other decomposition products. These ammonifiers, indeed, comprise what is numerically, perhaps the largest, group of soil organisms. It was formerly supposed that crop plants were unable to assimilate nitrogen in the form of ammonia. The production of ammonia by bacteria was, therefore, regarded as merely a preliminary step in the preparation of suitable plant food. More recent investigations show clearly that many crop plants, especially cereals, are able to assimilate ammonia nitrogen. The ammonifiers, therefore, do prepare a suitable food for crop plants, and because of the rapidity of their action and because of the enormous number of them that are found in all soils we shall probably have to consider this the most important group of bacteria. The fact that they are widely distributed, however, makes them somewhat less interesting from the standpoint of controlling fertility, since it is doubtful whether conditions obtain in any agricultural region where these bacteria are not present in sufficient numbers to transform rapidly into ammonia whatever proteid nitrogen may be turned into the soil, provided conditions for bacterial growth are favourable. In this connection it is interesting to note that the Subtilis group, a sub-division of the group of ammonifiers comprising four or five distinct species, occurs probably in every cultivated country. It has been found in every country where any attempt has been made to isolate these species. The products formed by the various species of bacteria in the ammonifying group, in addition to the ammonia formed from the proteid nitrogen, are not well-known. It is, therefore, a possibility that some of these bacteria may produce substances injurious to the growth of crop plants. The so-called soil toxins, which may or may not be important factors in limiting the development or continued cultivation of certain crops, may be produced by these bacteria; there is as yet, however, no satisfactory evidence that such is the case.

NITRIFYING BACTERIA.

The nitrifying bacteria are in reality two groups of organisms. The first group when supplied with mineral plant food and with ammonia nitrogen transforms the ammonia into nitrite. This group, which formerly was considered to consist of a few very highly specialised organisms, is now known to number many species, most of which, however, have the power of making the transformation of ammonia to nitrite only to a moderate degree. The large number of organisms having this power makes it seem probable that usually they may be more important than the few species that are more active and also are more seldom found. The second group of nitrifying bacteria is able to further oxidize the nitrogen in the form of nitrites to nitrate nitrogen. Nitrate nitrogen is the form of nitrogen usually considered to be of the highest value as plant food, while nitrite nitrogen, except in very minute quantities, is an actual poison to crops. This specialized group of bacteria, therefore, which is able to feed on nitrate nitrogen and as fast as it is produced transform it into desirable food, is of extreme importance in all cultivated soils. Like the ammonifying bacteria, however, the bacteria of this group also are widely distributed and usually are present in sufficient numbers to perform their proper functions. They develop best in soils that are kept in good tilth, and usually grow very sparingly, if at all, in water-logged acid soils, and but sparingly in the fine-grained clays and gumbos that are almost impervious to the air.

DENITRIFYING BACTERIA.

The denitrifying bacteria, many of which are also ammonifying bacteria, are those which have the power almost diametrically opposed to that of the two groups just described. These organisms transform nitrate into nitrite, perhaps also into ammonia, and certainly many of them are capable of breaking up the molecule entirely and giving off free nitrogen gas. This group of organisms if functioning in this manner constantly would soon destroy the most fertile land, but although these organisms are found generally, they are not usually very plentiful and they do not become active denitrifiers unless afforded certain definite conditions for growth. The requirements of different species of the denitrifying group vary considerably; most of them will transform nitrate nitrogen into nitrite if organic material, such as beef broth or plant extracts, or even manure, be supplied them together with nitrate nitrogen. This fact illustrates the danger of applying nitrate fertilizers and manure simultaneously to a crop. Especially if the soil is moist or water-logged at the time there ensues a rapid development of nitrites with consequent injury to the crop. If nitrates and manure are to be applied to a given field, the manure should be applied weeks or, preferably, months in advance, in order to allow the preliminary decomposition of the proteid compounds in the manure to proceed to a point where they will no longer be food for denitrifying bacteria.

NITROGEN-FIXING BACTERIA.

The nitrogen-fixing bacteria are those which have the power of combining the atmospheric nitrogen with their other food materials and forming proteid nitrogen. Their activity can be enhanced by the improvement of the soil tilth, and sometimes also by the addition of carbohydrates, such as sugar and molasses. It is probable, however, that cellulose which has been decomposed to some soluble form is as good a food as any of the sugars produced commercially. Since the development of these free-living, nitrogen-fixing bacteria is presumed to be largely responsible for the continued fertility of agricultural land and since it is probable that these bacteria are the chief cause of the undiminished fertility of the lands of the intermountain district in the northwest, where continuous grain cropping has produced no apparent diminution in soil nitrogen, both the importance of this group of bacteria and the probable correlation of the development of nitrogen-fixing bacteria with cellulose-dissolving bacteria are obvious.

NODULE-FORMING BACTERIA.

An important sub-division of nitrogen-fixing bacteria and one which is perhaps better known than any other group of soil bacteria is the nodule-forming bacteria of the legumes. These bacteria when associated with the roots of the leguminous plants and a few non-leguminous plants form nodules upon the roots which are capable of using as food large quantities of atmospheric nitrogen. Since the study of the nitrogen, accumulating power of legumes bearing root nodules deals with a definite and comparatively simple relation of a single type of organism to a single type of plant, it has been possible to develop these investigations upon a pure-culture basis; in other words, it has been possible to isolate the nitrogen-fixing organism from nodules of leguminous plants and with these cultures produce nodules upon other plants of the same species in different localities. Owing to the fact that different legumes are constantly being introduced into agricultural regions, the importance of being able to disseminate the nodule-forming bacteria is obvious. For many types of legumes this is desirable, not only from the standpoint of making the crop a better nitrogen-fixer and better soil renovator, but because for most legumes the crop is actually larger when properly inoculated. Pure-culture inoculation is less certain than inoculation by means of soil from old, well-inoculated fields, though, of course, it is free from the danger of introducing troublesome weed seeds or plant diseases.

A casual review of the present status of soil bacteriology shows that it is a subject of almost bewildering complexity, but very intimately associated with the normal physiology of all crop plants. By learning what functions must be performed in the soil and by studying each group of organisms that has a measurable function, we believe that we can learn how to enhance the desirable activities of the living soil and to check the undesirable ones. We may never find another relationship so simple as that existing between the legume crop and the nodule bacillus or one which we can control so simply from a central laboratory; but surely a thorough comprehension of what happens in the soil will teach us how to maintain the fertility of the soil more surely than blind and rather purposeless experimentation. The great majority of plant tests of fertilizers illustrate the impossibility of satisfactory deductions from experiments entirely upon an empirical basis. We must deal in aeons and not in generations if agricultural science is to be advanced by the cut-and-dry method.—*Bureau Plant Industry.*

NEW ZEALAND PROHIBITION AGAINST CROWN-GALL.

The New Zealand Government has issued a proclamation prohibiting the introduction into the Dominion of any fruit or plants infected with the disease known as root-knot, hairy-root or crown-gall (Bacterium tumefaciens). If any plant, fruit, &c., affected is introduced or shipped to New Zealand, it and any wrappings, &c., will be reshipped or destroyed at port of entry. Reshipment, however, is conditional on the approval of the Inspector, and in the event of destruction, the fees for such destruction are payable by the person in charge of the consignment.—*The Gardeners' Chronicle.*

The Planters' Chronicle.

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Contents.

The Planting Expert continues his interesting report of his tour in the Travancore High Range, which may unfortunately be interrupted by his enforced visit to inspect those Estates in Mysore attacked by Green Bug, and his return will depend on the severity and extent of the area attacked.

The Scientific Department publishes useful suggestions to destroy pests, and it is specially noted that fire is the best means of exterminating them. Mr. Nicolls has done good service in drawing attention to the damage done by the caterpillar and the best way of reducing it.

This issue is largely taken up with reports of District Association Meetings—three of which are published. The report of the Anamalai Planters' Association is continued and finished in this issue. Taken altogether, it is a very interesting report.

The Wynad Planters' Association in offering to subscribe towards the cost of an appeal under the Madras Labour Law by a Nilgiri Planter set a very good example in showing that all planters' interests are identical in this matter of labour, but as the subject is *sub-judice* we refrain from commenting on it.

Two short reports of the Kanan Devan Planters' Association find place in this week's issue and we trust that united action between the Peermade Association and the Kanan Devan Association supported by the Planting Member will have the desired effect of getting the Theni Bridge completed. The Chairman spoke very openly on the matter.

We have received the second number of the *Ceylon Planters' Gazette* which is mainly taken up with the Ceylon Labour Commissioner's first report. It is a very comprehensive statement. The total number of copies despatched to the various districts in Ceylon alone from Southern India through the Ceylon Commission in 1912 totals 93,925 and a large increase is anticipated in 1913. The Ceylon Commissioner concludes his report with these words "Recruiting within the planting area of the South Indian Estates is both unnecessary and indefensible and I am using the influence of this Commission to prevent it."

Scientific Officer's Papers.

CXVII.—REPORT ON A TOUR IN TRAVANCORE HIGH RANGE.
(*Continued.*)

GREEN MANURES.

The fertility of a soil largely depends on the amount of organic matter contained in it, and this with its accompanying Nitrogen is very likely to be a dominating factor in Tea. This organic matter is a medium for the activities of bacteria which by their life processes manufacture nutrient solutions which serve as food to the Tea plant. It cannot be said definitely what percentage of organic matter should be present in the soil to produce Tea, but as a rule bushes grow most vigorously in a soil which contains a high percentage of this material, and as the general tendency of all cultivated soils is to lose organic matter this is one of the first things to try when the Tea begins to deteriorate. It can be easily and cheaply supplied to the soil by means of Green manures, and this class of fertiliser has proved most valuable under a great many different conditions and in a great many countries.

The best kind of plant to use for a green manure is a Leguminous one because these particular kinds of plants are able to obtain Nitrogen from the air through the medium of bacteria contained in nodules on their roots, and this Nitrogen can be transferred to the soil by cutting and digging them in at the right time.

On the subject of Green Manuring for Tea I cannot do better than quote from an article by Dr. Hope and Mr. Tunstall in a recent number of the *Quarterly Journal of the Scientific Department of the Indian Tea Association* (IV. 1912). These authors say:—

"When a good crop of 'jungle' springs up naturally after each round of hoeing and is buried in by the next round, this obviously affords a valuable means of adding organic matter to the soil. On gardens which are fortunate enough to be well supplied with labour the mistake is sometimes made of hoeing too frequently, with the result that practically no jungle is permitted to grow. This would be very well if the land were hoed with the object of keeping down jungle in order that a suitable green crop might grow instead, but it is usually done not with this purpose in view, but because the opinion exists that hoeing cannot be overdone. This is a mistake. Consequently on such gardens the excessive cultivation tends to exhaust the soil rapidly and the estate is living on its capital.

"One aim of green manuring is to enrich the soil in respect of Nitrogen. Only certain leguminous plants are capable of doing this, for they alone have the root nodules which harbour the species of bacteria which actually promote the fixation of Nitrogen. Consequently, serving as they do a double purpose, that of supplying organic matter and nitrogen, leguminous plants chiefly are used as green crops. The nitrogen which a soil acquires by the growth of a leguminous crop is not fixed in amount and depends upon other things beside the actual weight and composition of the crop, for, it must be remembered that the total nitrogen in the crop is the sum of that which is taken from the soil by the roots and of the atmospheric nitrogen which is fixed by the bacteria of the root nodules and the proportions of the whole supplied from each source is not constant. If the soil contains so large a supply of available nitrogen that the plant can flourish without fixation of atmospheric nitrogen the root nodule bacteria becomes inoperative and the nodules are few and small yet the crop may be good. If, on the other hand, the soil is poor in nitrogen but is rich in other respects, large nodules develop and the ultimate addition of atmospheric nitrogen to the soil may be considerable though the crop may be poorer than in the above instance. In some cases, however, the soil may be too poor to provide other constituents necessary to the plant, such as potash, phosphates, &c., and a poor crop only is obtained and no opportunity is afforded of enriching the soil to any extent in respect of nitrogen."

" An excellent opportunity is here afforded for the skilful use of manures. Treating the soil with a manure containing potash or phosphates and no nitrogen for the purpose of enriching the soil in respect of nitrogen may be a new idea to many, particularly to those whose only idea of manuring is to apply periodically the amount of nitrogen, phosphoric acid, and potash which they calculate has been removed by the bushes since the previous application, but the manuring of green crops, and especially of such as are leguminous is an extremely sound method of promoting fertility of the soil."

The question of the proper legume to grow in any soil is one that must be determined largely by experiment. In all cases it should be the legume that grows most luxuriantly upon soils not particularly well fertilised and which at the same time produces the most abundant crop of nodules upon its roots. These factors will depend upon climate, the chemical nature of the soil, and the variety of soil bacteria. In selecting the legume all the factors within reach must be taken into consideration. Some species grow better in some climates than others, and certain soils seem to be for some reason better adapted to certain species quite independent of the question of the presence of the proper soil bacteria.

Green manuring is of particular value in sandy loose soils where the humus is scanty. In such soils so rapid is the draining that it is sometimes difficult to get fertilisers to remain in the soil long enough for their proper assimilation by the plant. The use of legumes dug in to furnish a mass of decaying vegetation greatly improves the texture of the soil, and will in time give a fair humus content.

No value accrues from green manuring unless thorough decomposition occurs. For this reason it is generally best to dig in the leguminous crop before it has fully matured for then it has assimilated most of its nitrogen but has not become too bulky for proper decay in the soil. In the case of crops like *Crotalaria* it is best to cut them about the time they begin to throw out flower spikes.

PRUNING AND PLUCKING.

It would appear that if manures are applied to tea they should be applied either before or at the time of pruning. When applied before, the object is to get a good growth of wood on which to prune, and a big healthy root system to start the pruned bush.

Manuring is expensive especially in a district like this where transport expenses are very heavy and so every effort must be made to get the utmost from the manures applied and it must be remembered that manuring, pruning and plucking are all parts of the same problem. All knots should be removed so as to leave a clean run of sap to enable the bush to get the utmost value out of the plant food which has been given to it, and plucking should be light after pruning. Good and careful pruning is a necessary part of the expense of manuring, but both have been proved to pay if properly done.

Finally, I would point out that it is better to begin manuring too early than too late. It is comparatively easy to bring a field of tea back to vigour when it is just beginning to show signs of deterioration but very difficult to do so when it has really deteriorated.

(To be continued.)

RUDOLPH D. ANSTEAD, *Planting Expert.*

THE SCIENTIFIC DEPARTMENT, U.P.A.S.I.

Tea Pests.—Specimens of the Faggott-worm, *Clania crameri*, have been sent into this office recently. This is a brown caterpillar which cuts off short lengths of young twigs and fastens them together parallel to each other. These cases, or 'faggotts,' vary in length from half an inch to three inches in length, and from their shelter the caterpillars feed by protruding the head and thorax from one end. At the slightest alarm they withdraw into the case. In this particular instance the planter who sends the specimens reports that the pest began in November last and that in some places it has stripped every twig off big bushes while one field of 48 acres has been so badly attacked that no flush is got off it. It has also appeared in fields just ready for tipping when it does considerable damage. It is attacking the bark of the trees as well as the foliage and is on the Grevilleas as well as the tea. The only cure is to collect the faggott cases and burn them and there is nothing to add to the recommendations of Watt and Mann in their book on *The Pests and Blights of the Tea Plant*, which are as follows:—

"It should be recollected that the female is a wingless creature that never leaves her house, so that old and dead looking cases, as well as those seen moving about, should be collected, since the former may contain eggs. Mr. Cotes very properly remarks that 'the most remarkable feature about the caterpillars is their extraordinary vitality. Indeed, they will withstand an amount of rough handling which would be fatal to the larvæ of almost any other group of moths. The point is an important one in considering how best to dispose of what are brought in by coolies.' All bags collected should in fact be burned in the boiler fire."

This is the second caterpillar pest reported recently. The outbreak of *Heterusia* in the Nilgiri-Wynaad reported in the *P. C.*, Vol. VI, p. 689 has, it is hoped, been checked by steady collecting of caterpillars and cocoons. Mr. Nicolls writes of this pest that it is too early to say whether it has been totally eradicated, but he warns others that these caterpillars are capable of doing a considerable amount of damage, more than they are usually credited with, and they seriously affect the vigour of the bush. This pest has been identified by the Government Entomologist as *Heterusia virescens*, and not *H. cingala* as originally stated. The latter species is confined to Ceylon, and the Assam records really refer to *H. magnifica*.

The Use of Ammonia in Rubber Tapping. A correction is necessary in the tables of measures given in these notes on page 15 of the present volume. *Two* tablespoonsful are equivalent to a fluid ounce and not one as stated. My correspondent on this subject has sent me some estimates of cost of this process based on London quotations. I refrain from quoting these for the present, however, as I hope to persuade him to write an article on this interesting subject.

Checking of Fertiliser Guarantees.—Attention was called to this proposed piece of work on these notes on p. 74. A number of samples have been received, and planters having fertilisers, the guarantees of which they desire to have checked, should send samples in as soon as possible. Attention should be carefully paid to labelling and the information asked for in the note quoted above should in all cases be sent.

Green Bug on Coffee.—There has been an unfortunate outbreak of Green Bug (*Lecanium viride*) on Coffee in South Mysore. The Scientific Assistant for Mysore is on the spot and doing all that is possible to stamp it out at once, but the importance of the matter necessitates a visit of inspection from the Planting Expert who has only just returned to head quarters from a protracted tour in the Pulney Hills and the High Range of Travancore.—R. D. A.

DISTRICT PLANTERS' ASSOCIATIONS.

Anamalai Planters' Association.

(*Continued.*)

2. *The Honorary Secretary's Annual Report and Accounts :*

Membership.—During the year there has been an increase both as regards Estates and private members. On the old basis of subscription the votes carried by estates has increased by 120 and private votes by 4.

Meetings.—There have been 2 General Meetings and 3 General Committee Meetings. There was an average attendance of 11 members at the General Meetings. The General Committee Meetings were always fully attended. At the General Meetings it was very noticeable the way in which the younger members abstained from speaking and this is very much to be regretted. We do not want to see the "old district hacks" brought out at every meeting—"new blood" should have a try as it is only by the younger members coming forward and fearlessly expressing their views that we shall be able to know the true feelings of the district.

Labour.—There has been a considerable improvement this year as regards the *number* of coolies—but as regards the *quality* it is worse than usual.

It is a very debatable question whether the increase in wages, or, the famine rates existing in the low country in June and July, has brought in the extra coolies this year.

Owing to the increase in wages, the cost of working has gone up. The average cooly now is physically incapable of doing for 6 annas the amount of work done 10 years ago by coolies for 3 annas and 3½ annas—and the more pay he gets the less inclined he is to *try* and work.

With tea to pluck, and rubber to tap, and, happily, good prices ruling for both, this increase of pay may be all right—but, had not the markets outside the United Kingdom come to the rescue in their active demand for Indian Teas many of us would have wanted the old 3½ anna man cooly back again—for, we should have been unable to import plucking and tapping women *alone* on to our estates without finding work for their men.

In order to try and bring about a scheme leading towards the combination of labour in the different districts you consented to raise your subscription to the parent Association on the condition that it should bring forward such a scheme in the near future. From reports in the *Planters' Chronicle* it would appear that the Committee appointed to draw up the scheme have had many difficulties to contend with, and it seems doubtful whether they will ever be able to arrive at a scheme that would be adopted by everybody. You were strongly in favour of the Registration Scheme put forward and said it was excellent as far as it went, but thought that it might go much further. It was, however, *something attempted* which is what you want to see done.

Police Patrols.—The thanks of the Association are due to the District Superintendent of Police for placing Police patrols during the coffee crop season and to Mr. S. Vaidyanathan, Sub-Inspector of Police—Kotoor for his supervision and checking of the cartmen's passes.

Road and Communications.—The branch road and bridle-paths of the district have now been given over by the P. W. D. to those members directly interested in their up-keep. The thanks of the Association are due to Colonel Ellis, R. E., P.W.D. for helping us.

Hospital and Medical.—A site for the proposed hospital has been felled between Valparai and Monica, but the burning off the same has been delayed owing to the likely risk of danger to the neighbouring property if burnt off now during the dry months. This delay in having the hospital erected is greatly to be deplored. Much suffering has been caused in the district that could easily have been avoided had we had an efficient hospital staff.

Hospital. -In the accounts you will see that Rs.2,400 has been collected on account of the Hospital Fund, and is standing at the credit of that account in the Bank.

Some of you have paid your subscriptions under protest; because Government have not carried out their part of the contract. I have carried out your instructions regarding payments to Government and the recent correspondence I have had on the matter I propose laying before you.

I am glad to say that the newly appointed Assistant Surgeon, K. Ibrahim Khan, appears to be quite a capable man and has been carrying out his work to the satisfaction of members; it was quite a relief to me to get rid of the complaints and correspondence I had in connection with his predecessor.

Transport.—Owing to the growth of the district and the difficulties we experienced in last September and October in obtaining the requisite transport for our grain and supplies caused by the enormous trade that is now being carried on each year in ground-nut, between the foot of the Ghât and Coimbatore, this Association considered that the time had now come when we should make an attempt to try and get a transport service of our own, and it was unanimously agreed that we might have a possible remedy for the present mode of transport if we could have an *aerial ropeway* into the district. Messrs. Barber and Pascoe have been interesting themselves on our behalf in this matter and are now having a rough estimate of the cost prepared by Messrs. Walker Sons & Co., of Colombo.

I would call your attention to the vital importance of giving the question your most careful consideration. It would only require a strike amongst the bandymen, a bridge to be carried away by rain on the ghât, or, a violent attack of cattle disease in the low country, and we should be left without any means of getting up supplies.

The roads are quite unsuitable for motor-lorry transport.

Postal Affairs.—The Postmaster-General, Madras, has been addressed by me on several occasions as to the urgent necessity of the district being given a proper Post Office and although I have had no reply regarding the building of a suitable office—the following communication from the Sub-Postmaster, at Valparai, dated 20-1-13 may lead us to hope for the same in the immediate future as it would be ridiculous to expect the postal department to make a combined *Post and Telegraph Office out of the present building:* "I am directed by the Inspector of Post Offices, Coimbatore Circle, to place before you the following, which, I hope, you will move the matter in your meeting. The Valparai Branch Office has been converted into a Sub-Office from the 1st instant 1913. Now the Department intend to make it as a combined office with Telegraph attached. The Department wish to know whether the Association or individual members will be good enough to guarantee the revenue. Hope *you will give the matter your immediate attention.*"

You will remember that the Association was asked to what extent the district would be prepared to guarantee a combined Post and Telegraph Office and what assessment per cultivated acre would be necessary to cover the proposed figure. You instructed me to write and say that a great deal more information regarding figures was required before anything could be decided and since then I have had no further information on the subject.

S. I. P. Benevolent Fund.—I should like to see everybody supporting this Fund. There are only 5 members now who do not subscribe and I am certain that they have not realised the vast amount of good that this Fund might do in helping some "lame dog," or, his dependents. "over a stile," or they would have, ere this, weighed in with their subscriptions.

Proposed Club.—This is not an Association matter—but it indirectly affects the Association. The matter came up after our last Committee meeting on 7—12—12. Since I have had the honour of being your Honorary Secretary I have felt very reluctant to write to any of you and ask you to have a meeting at your bungalows. It was all right in the days when there were only a few planters in the district but now we have 21 resident members —and more are coming—and a time has now arrived when we should have some public place where we can hold our meetings where men can foregather on holidays and have some amusement.

At present we see little of one another except at the invitation of a few, who, for the occasion. run their bungalows on the lines of a club and many of us realise that this is not fair—that it is imposing on the hospitality of these people. and that it is not, as it should be, for the good-will of the district.

In our own interests, therefore, we should start a District Club soon if only on a small scale to begin with.

Accounts.—The Accounts are now before you and if found correct I would ask you to pass them and to kindly accept my resignation.

In conclusion I wish to thank our Chairman for the willing assistance he has always given me—and also the rest of the members of the Association for the very great consideration they have shown me during the past year.

(Sd.) J. HATTON ROBINSON,
Honorary Secretary, A.P.A.

The Accounts were passed—and it was proposed by Mr. Congreve and seconded by Mr. deSalis, and carried unanimously;—"That both the Chairman's address and the Honorary Secretary's Report be printed with the proceedings of the Meeting."

As regards the matter of "Access to New Estates" commented on in the Chairman's address—it was proposed by Mr. Robinson and seconded by Mr. Congreve and carried unanimously:—"That a Sub-Committee be formed consisting of Messrs. Duncan, Simcock, and Marsh...to draw up a resolution regarding the right of way into the new blocks of land recently granted by Government, and that the resolution be submitted to Government."

Electric Power and Ropeway.—The majority of the Meeting was not in favour of a combined Electrical Scheme and Aerial Ropeway for the district.

As regards the Aerial Ropeway—the Meeting viewed the same with favour and awaited Messrs. Walker, Sons & Co's supplementary Estimate. The Honorary Secretary was requested to forward the views of the Meeting to Messrs. Walker, Sons & Co. and to urge the forwarding of the scheme as soon as possible.

4. *Hospital Site and Future Township.*—Mr. Marsh informed the Meeting that he had heard unofficially that Government had intentions of building at a very early date not only a hospital but also a Post Office and a Travellers' Bungalow and contended that the present site, selected by the Collector of Coimbatore, between the Valparai and Monica Bungalows—on the main road, was unsuitable for the township, as the land available there was insufficient, and contended that the proposed buildings should be erected on the land known as the "old Hospital Site"—situated near by the Paralai-Castlecroft Road,—between the Puthutotam and Castlecroft Bungalows,—and that if these other buildings were to be erected along with a Hospital that this would do away with the present objection to the Hospital being there—namely, 'isolation.'

Mr. Marden said he was agreeable to the old Hospital site being selected—provided that Government would erect *simultaneously with the Hospital* other Public Buildings and the Hon'ble Mr. E. F. Barber had a proxy to the same effect. Mr. Robinson said that if this subject was again going to be opened that in the interests of the south and south-westerly estates of the district he would like to see the future township site selected as far into the district as possible. He said that the district which had only one inlet or outlet commenced about the 20th mile and that the Kalianapandal Estate lower Bungalow was at the 36th mile or 16 miles from the head of the district the bungalow at present furthest east was Perria Kurramallai—about 3 miles from the head of the district.

To send to Valparai for the post now his assistant had to send 12 miles whereas the man on Perria Kurramalai had only to send about 7 miles and that if the "old hospital site" were selected it would be even further from his end of the district. He recognised the fact that his estate could not possibly be a favoured one being at one end of the district but contended that when the "old hospital site" which is within 4 miles of the entrance to the district was chosen it was selected by the Managers of the 5 properties then opened in the district—and all of whose bungalows were within 4 miles of the chosen site—one bungalow being within a mile of it, and that this was quite central for *these* men but that *other* men had come into the district since then and should now get some consideration if the matter was again to be opened up. If a permanent township site was decided upon *close to the entrance of the district*, it meant that the estates situated well into the district would always have trouble with their labour and transport, and, he thought that this point had not been given enough consideration. The Estates furthest from the township, on the outlet side of the district, would always have the advantage in transport and labour—for everything coming up to the town must pass *through* most of the Estates at the head of the district, and very close to the remainder. He considered that a fine central position might even now be got close to the main road, near the 27th mile stone, which was approximately half way between the most eastern and western estates in the district. Mr. Simcock was against the idea of constructing any buildings on the "old hospital site." He contended that the site for the hospital and township had been selected by the Collector and that the Association ought to agree to that site, and not open the discussion again.

Mr. Duncan said he saw the disadvantage the western estates would be at if either the "old hospital site," or the site chosen by the Collector were selected—this latter site being close to his own estate suited him personally but that he would like to see a site agreed upon that would suit everybody. As no definite site could be unanimously decided upon the following resolution, proposed by Mr. Congreve and seconded by Mr. deSalis was put to the

Meeting and carried:—"That the Meeting is agreeable to have a *temporary* hospital built on the site selected by the Collector but that if other buildings are to be built in the district that the Planters be consulted as to the sites for the same."

5. *Cooly Shelters on the Ghât Road.*—In reply to the Collector's letter No. 28/D. B. of 1913, dated 10—1—13 the Meeting were of opinion that the estimate for cooly shelters was excessive, but that members would be willing to contribute toward the cost of the shelters if they were constructed at a reasonable figure but considered that Government should construct *these very necessary shelters* themselves.

6. *Medical Affairs.*—The reply to the Honorary Secretary's letter of February 10th, 1913 to the D. M. O. was awaited.

7. *Special Magistrate for District.*—A reply to the Honorary Secretary's letter of 10-2-13 to the Collector of Coimbatore was awaited.

8. *Brake Logs on Bandies.*—The Meeting agreed to the Acting District Forest Officer's suggestion to have printed forms in the vernacular, that these should be handed to the bandymen, and that afterwards it was entirely a matter for the Forest Department to deal with. The forms in the vernacular should be as follows:—

Permit the removal of....................Brake poles on.................carts from the...................Estate issued to........... ....

Note.—This permit does not cover the removal of any poles in excess of 6 feet in length, and 6 inches in diameter, or the removal of any of the following species namely:—Jack, White Cedar, Red Cedar, or Poonspar.

Date...................... Signature.......................................

9. *Labour Questions.*—The following rules were unanimously agreed to:—

1. Re. *Fellers.*—That an agreement be not entered into with Fellers more than for the following season:—

2. Re. *Maistries.*—That no Manager shall within his knowledge, after having made *very* full inquiries employ or advance labour maistries from neighbouring estates within the Anamalai District without their producing a discharge note.

The Honorary Secretary was requested to get all the District Rules printed and sent to members.

10. *Scientific Department.*—In reply to the U. P. A. S. I. Circular No. 2/13: The Meeting agreed to continue the Association's original subscription to this fund, *i.e.* Rs.60 a year—but as regards the Association's present subscription the members were unable to say anything until the next Annual General Meeting of the U. P. A. S. I.

11. *Office-Bearers*:—

The following were elected Office-Bearers for the year:

Chairman ... Mr. G. L. Duncan.
Vice-Chairman ... Mr. B. A. Marden.
Honorary Secretary ... Mr. J. Hatton Robinson.

After the election of the above the proceedings terminated.

(Signed) GEO. L. DUNCAN.
Chairman.

(„) J. HATTON ROBINSON,
Honorary Secretary.

Wynaad Planters' Association.

Proceedings of a General Meeting held at Meppadi Club, on March 12th, 1913.

PRESENT.—Messrs. Briggs, Darkin. Macleod. Milton. Nicolls, (Chairman), G. R. C. Parker, J. C. Parker, Powell, and C. E. Abbott, (Honorary Secretary).

1829. *The Proceedings of last Meeting* were confirmed.

1830. *New Member.*—Mr. G. R. Briggs was elected.

1831. *Shipment of Tea during Monsoon.*—Read letter from the Honorary Secretary to Coast Firms, and replies from Messrs. Parry & Co., acknowledging receipt, and from Messrs. Harrisons and Crosfield (Calicut) saying they had shipped 1,221 cases by Clan Frazer in August last and had received no complaints of the condition of the tea. Proposed by Mr. J. C. Parker, seconded by Mr. Darkin and carried.—"That as we understand there have been recoveries made on account of insurance in regard to the Clan Frazer shipments, the Honorary Secretary be asked to circularize members and find out if this is correct."

1832. *Delays of Parcel Post.*—Read letter from the Honorary Secretary to the Superintendent of Post Offices, West Coast Division, and his reply saying that instructions have been given to the Calicut Postmaster to improve matters in certain particulars, but that the delays are only occasional. As the general opinion of the Meeting is that the delays are habitual, and there is no sign of improvement the Honorary Secretary was instructed to address the Postmaster-General with a copy of the correspondence. Members are asked to report specific instances to the Honorary Secretary. One example is that of a registered parcel despatched from Calcutta on February 21st by Messrs. Hall and Anderson (No. 4001) was not delivered in Meppadi till March 8th. The time occupied by a letter in transit is only 4 days. Another instance is that of a registered parcel despatched from Calicut (No. 402) on March 29th. and not received in Meppadi till April 1st.

1833. *Roads Coorg Korlikodam.*—Read Memorandum from District Board Engineer. Recorded.

1834. *Pooduppaddy Hotel.*—Rs.50 was voted for repairs to be sent to Mr. Chengaren.

1835. *Scientific Department U. P. A. S. I.*—Read U. P. A. S. I. Circular forwarding copy of a letter from Madras Government, Local and Municipal Department, regarding the contribution to the Scientific Department. Proposed from Chair and carried: "That this Meeting is of opinion that as long as the 'Scientific Officer Fund' remains a department of the U. P. A. S. I. this Association is prepared to pay 2 annas an acre to the U. P. A. S. I. on its subscribing area.

1836. *Tea Refuse*—Attention was called to Mr. Anstead's letter and his article in the *Planters' Chronicle*. Members who wish to sell tea refuse for manure are requested to communicate with Mr. Anstead, mentioning the quantity they can probably supply.

1837. *Madras Planters' Labour Law.—Non-execution of Warrants.* Read letter from Deputy Inspector-General of Police suggesting that a registry of marks should be kept in the case of all Maistries advanced. Members are requested to attend to this suggestion.

1838. *High Court Ruling.*—Read letter from Mr. Nicolls forwarding High Court Judgment (by Mr. Justice Sadasiva Iyer) upholding the refusal of the Sheristadar Magistrate of Gudalfur to further imprison Pongay Maistry who had been twice sentenced for refusal to fulfil his contract under Section 35 of the Madras Planters' Labour Law. Read also letter from Mr. Bownass giving reasons for believing that this judgment is not likely to be upheld on appeal.

The Meeting agreed with the view expressed by Mr. Bownass, and hoped that the judgment would be appealed against. The Association offered to subscribe Rs. 50 towards the costs of the appeal to show that it considers its interests in this matter identical with those of the Nilgiri Planter who prosecuted Pongay Maistry.

1840. *Machinery for Tea and Coffee Estates.*—Read U. P. A. S. I. Circular. The Meeting was of opinion that the Customs duty on this ought to be abolished.

1841. *Sale of Pepper Crops*—Mr. Nicolls suggested that in future members of this Association intending to sell their standing pepper crops should intimate the fact to the Honorary Secretary, so that the Proprietors of adjoining estates may have the opportunity of purchasing the same and so safeguard themselves against theft and restrict the number of receivers.

A vote of thanks to the Chair terminated the proceedings.

(Signed) J. S. NICOLLS,
Chairman.
(„) C. E. ABBOTT,
Hony. Secretary.

Kanan Devan Planters' Association.

Proceedings of an Extraordinary General Meeting of the K. D. P. A. held in the High Range Club, Munnar, on Saturday, the 8th March, 1913. at 3 p.m.

PRESENT.—Messrs. C. Fraser, (Chairman), S. H. Paulet, W. O. Milne, D. Mackintosh, G. R. Strachan. Dr. James S. Nicolson, H. L. Pinches, W. L. Ranking, J. S. Hawkins, J. C. Swayne, G. E. Bewley. J. B. Ingram, W. J. Dixson, C. Rowson. A. Blair Hill, W. A. Lee, A. G. Murray, J. M. Bridgman, and E. A. Hughes, (Honorary Secretary.) *Visitors*: Messrs. A. H. Mead, C. E. L. Ward, R. D. Anstead.

The notice calling the Meeting having been read. it was proposed from the Chair: "That the Minutes of the last Extraordinary General Meeting having been printed and circulated, be taken as read and confirmed." This was carried unanimously.

Mr. Fraser then said:—

Gentlemen,—Before proceeding further with the business of the Meeting I must ask you to pass a hearty vote of sympathy and condolence with Mrs. Imray in her recent sad bereavement. In Mr. Imray, the Association loses one of its oldest and keenest members and I am sure we all feel that we have lost a very good friend and brother planter.

This was agreed to unanimously, all members standing.

The following Agenda was laid on the table:—

(1). Theni Bridge.
(2). Kumbam Valley Railway.
(3). Retention of Planting Expert's Services by U. P. A. S. I.
(4). Mr. Anstead's Lecture.

The Chairman then said item 1 and 2 might be taken together. The question of the Kumbum Valley Light Railway and the Theni Bridge had been a pressing one for some years past. He was sure all regretted that in spite of their efforts and repeated representations to Government and the S. I. R. authorities there had been little or no result. The less said about the work so far done on the Theni Bridge the better. It was at present a standing disgrace to all concerned. He hoped all would agree that time had come for further steps to be taken to have the matter brought to the notice of the Government of Madras and he, therefore, begged to propose the following resolution:—

"That Peermade Planters' Association be asked to join us in a Deputation to the Governor of Madras to bring to his notice the urgent necessity for bridging the Theni River and for a Light Feeder Railway from the S. I. R. to Kuruvanooth, *via* Bodinayaknur." This was carried unanimously.

It was proposed by Mr. Pinches and seconded by Mr. Lee: "That the K. D. P. A. Deputies be the Chairman and the Honorary Secretary." This was carried unanimously.

The Honorary Secretary was asked to write to the Peermade Planters' Association and ascertain their views. In the event of their agreeing to join us, he was asked to write and ask the District Magistrate, Periyakulam, to join the Deputation, if possible, and to the Planting Member, the Hon'ble Mr. Barber, asking him to arrange to introduce the Deputation to His Excellency the Governor. He was also asked to write to the Agent of the S. I. R. for definite information as to their intentions with regard to the railway, especially in view of the survey which is at present being carried out by them.

The question of retention of the Planting Expert's services by the U. P. A. S. I. was then brought up. After some discussion, it was proposed by Mr. Murray and seconded by Mr. Bewley:—

"That this Association approves of the retention of the Planting Expert's services for a further period of 5 years on the present basis." This was carried unanimously.

The Chairman then introduced Mr. Anstead to the Meeting and said he felt sure that they were all very pleased to see him and felt that they all would be extremely interested in what he had to say to them. He proposed Mr. Anstead should speak to them and afterwards any member who had questions to ask, might do so. Mr. Anstead then delivered an address dealing with several points of local interest. After some discussion, the Chairman proposed a very hearty vote of thanks to Mr. Anstead for his interesting remarks and said that all would look forward to hearing Mr. Anstead again after he has seen more of the district. This wss carried unanimously.

A vote of thanks to the Chair terminated the proceedings.

(Signed) ERNEST A. HUGHES,
Hony. Secy., K. D. P. A.

Kanan Devan Planters' Association.

Proceedings of an Informal General Meeting of the K.D.P.A. held in the High Range Club, Munnar, on Saturday, 22nd March, 1913, at 3 p.m.

PRESENT.—Messrs. C. Fraser, (Chairman), H. L. Pinches, A. J. Wright, W. J. Dixson, A. E. Murray, J. S. Hawkins, G. E. Bewley, S. H. Paulet, William Mackenzie, A. Blair Hill, F. R. Westbrook, G. W. Cole, W. Fraser, J. H. Jeffrey, W. O. Milne, and E. A. Hughes, (Honorary Secretary.) *Visitors*: Messrs. C. E. L. Ward, Rev. J. H. Osmaston, G. H. Strachan, J. H. Bewley, D. V. Crowe, L. H. Ley, H. V. Wright, G. A. Holden, and N. S. Varada Chary, B.A.

The Chairman on rising said he had pleasure to introduce to the members Mr. N. S. Varada Chary, B.A., the District Superintendent of Post Offices, who had kindly come up in connection with the proposed improved Postal Service. He would later on explain to the members his scheme for their information and approval.

They had the pleasure at their last meeting of hearing Mr. Anstead, who, although he had only been in the district for a short time, gave us a most interesting address. Mr. Anstead has now a more extended knowledge of the whole district and its varying condition and he was certain what he had to say to them that afternoon would be of the utmost interest to them all. He called upon Mr. Anstead to address them.

Mr. Anstead informed the meeting that he would first go into the various subjects that had struck him during his tour through the district. He hoped, when he had finished, any one who wished for any further information would ask him, when he would be only too pleased to explain matters and help as far as he possibly could. Mr. Anstead then delivered an address dealing very fully with several interesting questions of local interest and a good deal of discussion followed.

A very hearty vote of thanks to Mr. Anstead for his address and the trouble he had taken was then carried unanimously.

Mr. Anstead then thanked the Association for their kindness and hospitality individually and as a body during his tour.

Mr. N. S. Varda Chary then addressed the meeting and explained very fully his scheme for bringing the mails into the district by the Ropeway and Tramway, instead of by Runners as at present, which gave the members the advantage of a day's earlier delivery of the mails. He pointed out that as the Ropeway did not run on Sundays it would be impossible to have the parcels carried on that day. He, therefore, asked the members of the Association if they had any objection to the Parcel Mail being detained at Bodinayakanur on Sunday and despatched the next day. After some discussion, the following Resolution was put from the Chair and agreed to unanimously.

"That this Association unanimously approves of the proposal that parcels should be kept on Sundays at Bodinayakanur Post Office and delivered the next day."

Mr. Varda Chary then went on to explain a proposal for improving and expediting the present delivery of parcels from the local Post Offices and this also met with the unanimous approval of the members of the Association.

The Chairman then proposed a very hearty vote of thanks to Mr. Varada Chary for all the trouble he had taken in endeavouring to meet the wishes of the Association, with reference to the Postal arrangements and for the improvements that his scheme would introduce when it came into force. This was carried unanimously.

A vote of thanks to the Chair terminated the proceedings.

(Sd.) ERNEST A HUGHES, *Hony. Secy. K. D. P. A.*

AGRICULTURAL DEVLOPMENT IN THE UNITED KINGDOM.

Speaking at the annual dinner of the Farmers' Club on Tuesday, December 10, Mr Runciman, President of the Board of Agriculture and Fisheries, referred to the assistance which the Development Commissioners propose to give to agricultural research. In the course of his remarks, he said:—" It was not enough merely to adopt a policy of slaughter, scheduling areas, and so forth. They should adopt so far as possible all the services that science could supply. They must give their research institutions, universities, and colleges the needful to ascertain more and more the nature of their most dangerous diseases. He had received permission only that day to announce that one of the schemes he had been enjoining for some months in the country had so far met with the approval of the Development Commissioners that they would shortly recommend to the Treasury a release from the Development Fund moneys for the following objects. First of all to provide in every one of what were now called the provinces for the purpose of agricultural education, the services at the headquarters of those provinces of men concerned with advice as to soils, crops, and so forth, but who should be concerned also with live stock; that each one of these men should be an organizer or supervisor, to organise in that province a live stock scheme which would be described in further detail. The Commissioners were also prepared to enable them, with an annual sum, to have engaged in their office a man of the highest class, who could not know everything about every brach of live stock, but, by general knowledge, would be able to give administrators advice, which at present they were without. Thirdly, premiums would be provided from the development Funds for the breeding of heavy horses, Shires, Clydesdales, Suffolk Punches." (From *Nature.*)—*The Agricultural News.*

The Sterilisation of Seeds.

Numerous methods are in use for destroying the micro-organisms which occur on or in the coats of seeds. The most general method consists in washing the seed with an antiseptic, such as corrosive sublimate. A new process, which appear to give yet more satisfactory results, is described by Messrs. PINORY and MAGRON in the *Bulletin de la Societe Botanique de France* (Vol. 59, 1912, p. 609). This process, which has been employed also by others, consists in immersing the seeds in commercial hydrogen peroxide. According to the observations of the authors cited, hydrogen-peroxide is efficacious in destroying micro-organisms, and produces no harmful effect on the seeds, even though the latter be soaked in it for many hours. Messrs. Pinory & Magron state, moreover, that hydrogen peroxide exercises an accelerating influence on germination. Peas treated with the reagent began to grow a day-and-a-half before similar untreated seed, and seed of *Orobus tuberosus* treated previously with peroxide germinated in 8 days as against 28 days taken by untreated seed. These facts, if they prove to be generally true, are of considerable importance, not only from a scientific and theoretical point of view, but also from that of practice. To give but one illustration, the seeds of many grasses germinate with extreme slowness: if they could be made to germinate in the course of a few days, not only would time be gained but loss from birds and ground animals would be reduced.—*The Gardeners' Chronicle.*

German Government to act against Valorization.

A Report from Berlin, dated January 14, stated that the German Government was asked that day to take immediate measures to counteract the artificial dearness of coffee brought about by the Brazilian valorization. The Budget Committee of the Imperial Parliament passed a unanimous resolution calling on the Government to take action.—*Simmon's Spice Mill.*

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(INCORPORATED.)

Contents.

The Scientific Officer continues his very interesting Report on a Tour in Travancore High Range, dealing with Pests and Diseases and the best methods of eradicating them.

The Planting Expert, Mr. R. D. Anstead, B.A. returned to headquarters on Monday, 14th April, from South Mysore, where he had been to inspect the area infected with Green Bug. A note on his visit and the pest will be found under the heading 'Scientific Department' in this issue. Mr. Anstead thinks there is no cause for any panic, as the Bug is being dealt with in a thorough way and is under control. The Mysore Agricultural Department are co-operating with the Scientific Department of the U.P.A.S.I. in supervising the stamping out of the disease in the Estates of Indian Planters and Dr. Coleman will probably pay a visit to the infected area shortly.

The Scientific Department publishes an article on 'Green Manures' and gives an analysis of a practically new plant. It is to be noted that only a very small amount of seed is available at this Office.

A report of the 49th Annual General Meeting of the South Mysore Planters' Association is published, the most prominent feature of which is the strongly-worded speech of the Chairman on the subject of the Mangalore Railway, and the Resolution passed at the Meeting expressing the unalterable opinion of the Association as to the necessity of this Railway.

From Mr. Dickins, Honorary Secretary, Shevaroy Planters' Association, under cover of a letter to the Editor, comes as a warning to all districts, a translation of a circular by a Labour Recruiter from Burma. There appears to be something peculiarly congenial in the air of Yercaud that attracts the Labour Recruiter of this stamp, and dulls his sense of moral obligation. This conduct cannot be too severely censured, and compares most unfavourably with the words quoted in our last issue from the Ceylon Labour Commissioner's Report, which merit and will receive the approval of all the Planting Community of Southern India.

Scientific Officer's Papers.

CXVII.—REPORT ON A TOUR IN TRAVANCORE HIGH RANGE.

(*Continued.*)

PESTS AND DISEASES.

The Tea in this district is singularly free from the usual insect and fungoid diseases, and being isolated and at a considerable distance from other planting districts it should be an easy matter to keep it free. Special care should be taken to avoid the introduction of diseases from outside, and all seed imported should be most carefully disinfected and the packages in which it comes burned. In this connection I would refer to the possibility of introducing Blister Blight from Northern India, though equal precautions should be taken to guard against the introduction of Southern Indian diseases. In the *Planters' Chronicle* (VI. 298) the method of disinfection advised by the Government Mycologist is described. The seed should be soaked for an hour in a solution of one part of Corrosive sublimate in 1,000 parts of water.

Fruit trees and garden plants are a particular source of danger, and these should not be imported into the district from places like Bangalore, where all kinds of scale insects and blights are common. In a recent report upon a tour in Mysore the Government Entomologist said, " when touring by rail I often see at railway stations consignments of plants and young trees, (mangoes &c.,) being sent by rail and it is very rarely indeed that I am unable to detect scale insects or other pests being carried with them." Every effort should be made to keep the district free from such pests and no ornamental or economic plants should be imported unless they have been previously fumigated. A fumigatorium has been established and is working satisfactorily at the Lal Bagh Gardens in Bangalore, and if any one wishes to obtain fruit trees or plants from that place he should insist on their being treated in this fumigatorium before they are despatched. Were it ever necessary to import large quantities of nursery stock, such as Citrus plants for instance, into the district, it would be advisable to build a fumigatorium and treat them all at some convenient point on the boundary such as Bottom Station.

It must be remembered that a disease introduced into a new district is always likely to prove disastrous because it is so often imported without any of its natural enemies and, should it find the conditions suitable, it may cause more damage than in the district from which it came where a balance may exist more or less between itself and the natural forces which hold it in check.

The most important pest, and one which causes a very considerable amount of loss, in the High Range is Rats. These are dealt with chiefly by means of traps and poisons. A note in the *Punjab Agricultural Notes* on the subject of field rat extermination may prove of interest. It is there stated that, " land owners troubled with rats or mice might try a method of destruction which has been followed with success in Faridkot. An ordinary brazier is provided with a dome-shaped cover in the centre of which is a small funnel. To the funnel is attached a piece of flexible tubing and to that again an iron pipe. Sulphur is sprinkled on live charcoal in the brazier and the fumes are carried by the pipe into the rat hole. They ramify through the holes and kill the inmates. Neighbouring exit holes should be blocked up as far as possible."—(*Agricultural Journal of India* VII. 2).

A very good poison is a mixture of equal weights of tar and sulphuric acid. This mixture is put down in the runs and round the holes and if a rat steps in it he is usually killed as he will lick himself and the acid kills him. The results obtained with this poison are apparent as the rat will usually go to water and be found dead in its neighbourhood.

An attempt has been made in the district to use Ratin and some of the preparations of a similar nature, but with little success. This is probably due to the fact that the heat of the plains to which these preparations are exposed during their transport either kills the micro-organisms in the culture, or renders them so weak that they have little or no effect upon the rats. The Imperial Bacteriologist stationed at Pusa, has investigated the efficacy of Ratin and Trope Ratin as rat exterminators and in his Annual Report for 1910-11 he said, " Experiments were made with fresh samples received from England. Ratin is a bacterial culture prepared in Copenhagen, which is intended to produce an infectious disease in rats which have fed on baits treated with it, and which then spread the contagion amongst others. Although the cultures when received at Pusa were alive, as was proved by transfers, no pathogenic effects followed when given with food to captive rats. In corresponding with the Director of the Ratin Laboratory at Copenhagen, I suggested that the virulence of the cultures might be regained by cultural methods in India."

" Trope Ratin is not a bacterial culture, but a vegetable poison the principal feature of which is its toxicity for rats and mice and harmlessness for other animals. Experiments proved that its efficacy in India depends upon its use within a limited period of time after its preparation, as rapid deterioration takes place with loss of toxicity."

It is possible that Ratin might be imported into the district on ice in the same way as the ova are obtained in the attempt which was made to introduce trout into the streams, and that the doctor, or some one else with the requisite technical skill, might be able to cultivate it and obtain it in large enough quantities for use on the estates.

The way to use Ratin in the Field is to catch a number of Rats and feed them on food containing the culture until they have contracted the disease and then to set them free in rat infested places to spread the disease among their fellows.

Of actual Tea diseases, Stump Rot appears to cause the most damage in the district. I have nothing to add to the method of eradication and prevention of this disease which will be found in the pages of the *Chronicle ad nauseam.* I would only here insist upon the necessity for a generous application of lime and a *big* pit.

Another pest which was in evidence at the time of my visit and causing perhaps more annoyance than actual loss was 'Flush Worm.' This is a small caterpillar which rolls up a leaf round the tip of the flush and proceeds to eat the contents of this temporary shelter. This is the caterpillar of a moth closely related to *Capua coffearia* if not the same. Probably the best way to deal with it is to put on a few special pluckers to gather all these rolled up shoots and bring them in and burn them. This checks the pest because it reduces the number of caterpillars that ever reach the moth stage. This is important because it is the female moth laying hundreds of eggs which distributes the pest.

Of other diseases there were, as far as I could see, practically nothing but insignificant traces, and these so long as the vigour of the tea is maintained should never cause any trouble. Their presence is, however, a potential danger if ever the tea is allowed to run down below a certain standard of vitality, and, as I pointed out when dealing with the subject of manures, every effort should be made to maintain the bushes in a high state of vigour. In my humble opinion the time to get an estate into tip top order and vigour and free from diseases like Stump Rot &c., is in good times when prices are high; then when bad times come the tea will be in a condition to withstand the neglect which it may be absolutely necessary to enforce upon it, and will have a store of energy to enable it to resist diseases which always lie in wait for the weakling and do more damage to unmanured, shuck, bushes, than to healthy ones.

Therefore I strongly advise all Tea planters in this district to get analyses made of their soils, carefully watch the bushes, and attend to Stump Rot patches, and other diseased places, and be ready with a systematic manurial plan and apply it at once if they see any signs of deterioration.

(*To be continued.*)

RUDOLPH D. ANSTEAD,
Planting Expert.

COFFEE.

Another heavy reduction in the world's visible supply, *viz* ; 710,000 bags during February, against 678,000 bags last year, can only be looked upon as favourable to higher prices. The Brazilian receipts were heavier and it is therefore evident that the deliveries must have been very large. Although temporarily causing some advance in the terminal market, the higher rates have not been maintained, and the close is either slightly lower or the same as last week. The trade buying has become so persistently of a hand-to-mouth character that after a period of good demand, business is naturally quiet, while dealers are distributing their late purchases. Moreover, as each month brings us nearer the end of the present campaign and the beginning of the next, when it is known there will be a plentiful supply of Brazilian, it is natural for dealers to act with caution. The auctions have been well supplied with new Costa Rica and some East Indian, but with more competition rates are dearer, so that for the present the lowest point seems to have been passed. Colourly Costa Rica shows the greatest advance, and it is quite 3*s*. higher than about a fortnight ago.

WORLD'S VISIBLE SUPPLY OF COFFEE, 1ST MARCH, 1913.

	Stock	
	1913.	1912.
	Bags.	Bags.
EUROPE—		
Copenhagen	71,000	69,000
Bremen	152,000	146,000
Hamburg	1,988,000	1,781,000
Holland	550,000	607,000
England	209,000	201,000
Antwerp	944,000	1,167,000
Havre	2,479,000	2,468,000
Bordeaux	44,000	32,000
Marseilles	157,000	133,000
Trieste	281,000	354,000
	6,875,000	6,958,000
Afloat to Europe	497,000	354,000
Visible Supply, Europe	7,372,000	7,312,000

—*Produce Market Review*,

THE SCIENTIFIC DEPARTMENT, U.P.A.S.I.

Green Manures.—Green Manures are of two kinds, those which are grown with the main object of adding organic matter to the soil, and those which are grown with the main object of adding Nitrogen to the soil. The latter class are the leguminous plants and the most familiar to planters in Southern India.

Some time ago my attention was called to a plant whch had been grown in a small clearing of Robusta coffee and cut and dug in. The particular clearing was a great success and a large portion of the success was put down to the green dressing which at the time was thought to be a legume. Specimens have been indentified by the Acting Government Botanist and it proves to be an Acanthaceous plant, and not a legume at all, *Peristrophe bicalyculata.*—It is an erect spreading bushy plant with small, entire leaves 2 inches by 1 inch, with small rose pink flowers. It grew to a height of about 18 inches and formed compact little bushes some 2 feet or more in diameter on the ground which it covered well, keeping down weeds very effectually. It is a surface rooted plant with a root spread of some eight inches on each side. It provided a good deal of material to cut and bury, or use as a mulch, at the time it began to flower. An analysis was made of this cut material which consisted of stems and leaves, but no thick woody parts or roots. The air dried material gave the following figures:—

		Cuttings. Air dried.	Ash.
Moisture		9·30	—
*Organic Matter		82·12	—
Ash	Silica	0·33	3·79
	Phosphoric Acid	0·38	4·31
	Potash	2·35	27·49
	Lime	1·82	25·26
	Other Mineral Matter	3·70	43·15
		100·00	100·00
*Containing Nitrogen		1·68	—

A very small amount of seed is available at this office and a little can be supplied to any one who may care to try the plant.

Green Bug in Mysore.—The Planting Expert returned to headquarters on 14th April from South Mysore where he had been to inspect the area infected with a sporadic outbreak of Green Bug (*Lecanium viride*). The planters are fully alive to the danger of allowing this pest to go unchecked and, with the assistance of the Scientific Assistant for Mysore, are doing everything in their power to tackle it at once, with the result that it is under thorough control and there is every prospect of its being stamped out, or at least kept from spreading. There appears to be no reason whatever for panic, or for regarding this outbreak in a pessimistic light. The Scientific Assistant for Coorg has been sent by the special Committee, who control his work, to study the Bug and the methods for its eradication which are being adopted in Mysore in order that they may be quite prepared to follow suit should it spread over the border. In the next issue of the *Chronicle* it is hoped to publish something about the policy adopted in Mysore to deal with the outbreak, and to discuss the question of how it may have been introduced.

R. D. A.

DISTRICT PLANTERS' ASSOCIATIONS.

South Mysore Planters' Association.

Forty-Ninth Annual General Meeting held at the Travellers' Bungalow, Saklaspur, March 21th, 1913.

PRESENT.—Messrs. W. L. Crawford, S. Sladden, C. Lake, C. K. Pittock, E. W. Rutherford, W. F. Scholfield, Thiselton Anderson, A. Thomson, A. R. Park, M. J. Woodbridge, (Hony. Secretary,) Honorary Member, G. N. Frattini, (Assistant Scientific Officer.), *Visitor*:—Mr. Hill.

Mr. W. L. Crawford was voted to the Chair and read the following letter from the President, Mr. F. M. Hamilton :—

Subbanhulli, Mudigere, Kadur District,
20th January, 1913.

THE HONORARY SECRETARY, AND MEMBERS,
"South Mysore Planters' Association."

Dear Sirs,—I wish to place my resignation in your hands. I am sorry I am not able to hold the position of President S. M. P. A. until our Annual General Meeting in April, but I find I am bound to leave for England early in February.

As regards matters now before the Association, I would like to make a few remarks :—

Extradition.—It has been suggested to me that, although this is impossible under Act XIII of 59 *it might be possible* to get warrants for service in Foreign States, if the Magistrate passed an order which accused failed to carry out. It is further suggested that the Association should approach the Mysore Government (not Madras Government) with a view to seeing whether they could not induce Madras Government to grant some degree of extradition.

Representation of Hassan District Board.—The Honorary Secretary can give you latest developments and show you correspondence.

Toll-Gates, Arsikere Road.—This matter has been referred to the Dewan.

Alteration of Tenure and Title Deeds.—As far as I can gather, there is a great probability that Government after re-survey and settlement will give lands now held on Rupee 1 assessment (30 years' tenure) on permanent tenure without payment of such taxes.

In October last Government issued an order that Title Deeds *need not be granted to persons who were not the original grantees.* This has been taken to mean that Title Deeds will be issued for lands acquired from others than Government direct. I think representations should be made to Government pointing out the hardships.

Gentlemen, I wish to thank you very much for the honour you did me in electing me President and I wish to personally thank our Honorary Secretary for the very efficient way he has carried on the work of the Association.

I am,
Gentlemen,
Yours faithfully,

(Sd.) FRANCIS M. HAMILTON,

and opened the meeting with a short address, Gentlemen,—Our President for the year having resigned and gone to England on a holiday, and you having done me the honour of electing me Chairman of this meeting, I feel at a considerable disadvantage as it is usual for the President to give you a resumé of the year's work at the Annual General Meeting.

I am unfortunately unable to do this but I will endeavour to briefly allude to a few subjects of general interest.

The past year will be always memorable in the annals of this Association for two things; firstly, the combined Planters' Associations of Mysore have at last their own Scientific Assistant, and he is now at work amongst us. I feel sure if he receives the support, he should, in his endeavours, carry out his experimental and research work; we, as a community, will derive great benefit from the same. I would, however, like to definitely state that Mr. Frattini's usefulness as a Scientific Assistant to the Coffee Industry in Mysore will in no small measure rest with ourselves, as we know, or should know exactly, where we need scientific help and guidance in our work, and it is for us to bring our wants and requirements to his notice, and help him as much as we can to find a solution for the various problems we have confronting us. It is quite hopeless to expect our Scientific Officer to do everything himself; we must first give him the help our past experience and local knowledge of our industry has taught us, and then endeavour to direct research and experiments along the lines that will have the maximum benefit to ourselves. If there is natural co-operation and assistance between the Assistant Scientific Officer and ourselves it will be very largely our own fault if we do not derive great benefit from his investigations and experiments.

The Government of Mysore have made up their minds to very largely develop railway construction in the State, and have appointed a Railway Engineer of great experience and reputation to go thoroughly into all the railway requirements of Mysore, with a view to the economic development of the Province and to advise them as to the most important lines to construct first.

This Association has, during the past twenty-five years again and again, pointed out that it matters not how much railways are developed in Mysore, their maximum usefulness will never be attained until direct railway communication to the West Coast through Mangalore is established. We are all of us more convinced now more than ever that a line from some point on the existing railway system to Mangalore is of vital importance to the State, and I unhesitatingly say the first link in the chain of railway development in Mysore should be the one leading to the West Coast.

Sooner or later, the vested interests, and I go further and say hostile interests, and influences now at work to prevent the natural developments of the State of Mysore will be forced to stand aside, as it is nothing short of a public scandal that it should be possible for any interests vested or otherwise to prevent a progressive State like Mysore developing its own province and resources in a manner most suitable to its own local requirements and necessities, and we look to the paramount power to insist upon justice being done Mysore in this respect, and also doing their share of the work by constructing their short section of railway from the Mysore frontier to the West Coast at Mangalore.

It gave the whole community, European and Indian, the greatest pleasure to welcome their Highnesses the Maharaja and Yuvaraja to the planting districts of the State, and I feel sure their Highnesses will retain very pleasant recollections of this beautiful and interesting part of their territory.

I think we may conclude it is His Highness the Maharaja's interest in and concern for, the Mulnaad, that initiated the prolonged tour of Mr.

Vishveswaraya, C. I. E., the Dewan, in this portion of Mysore, and you will agree with me in believing this personal interest evinced by the Maharaja and his Dewan will tend to foster and develop a larger and more sympathetic interest in this most important part of Mysore, its people, interests and industries.

In conclusion, I would point out that this Association will celebrate its Jubilee early next year and it remains for us to make arrangements to celebrate its fiftieth birthday in a suitable manner. I now call upon the Honorary Secretary to read his report.

SECRETARY'S REPORT.

Gentlemen,—There are 32 members of the Association 30 representing 45 Estates with a planted area of 6901 acres, but of these 2 gentlemen representing 341 acres have paid no subscriptions for 2 years and will answer no letters and cannot, therefore, be counted for purposes of assessment; there are also 2 personal members.

We have lost 3 members during the year, 2 having left the country and one having resigned, one personal member has also left the district and we have gained one new member.

ACCOUNTS.—The accounts for the past year are before you and show a credit balance of cash Rs. 904-14-9, and Reserve fund Rs.50.

There is still a certain amount to be paid to the Assistant Scientific Officer's Fund between now and June 30th the amount of which, I am unable to give as a call will be made through the Council of Planters' Association on an equal acreage basis when money is required for this fund. This, you will see in the Budget estimates I have put this down as Rs.1,000.

The Budget, Gentlemen, is, of course, only an estimate and shows a surplus of Rs. 587-14-9. I have not put down anything for expenses of delegates to U. P. A. as this was not drawn last year. I am also unable to estimate the amount of outstandings, there will be next year, so; I advise you to deal gently with the surplus, as unless subscriptions are paid more promptly next year than they have been this year, there will probably be a deficit of cash in the hands of the Secretary in the early part of the year. I have also left out of the budget the subscriptions to the Planters' Benevolent Fund. I shall be glad to answer any questions as to accounts and budget to the best of my ability, when this subject comes up for discussion.

MEETINGS.—There have been 4 general meetings during the year which have been held in different parts of our district and have been fairly well attended. By holding them in different parts nearly every member of the Association has attended one or other of the meetings. These meetings have been made necessary by some subject on the agenda such as instructions to delegates to U. P. A., election and instructions of delegates to Dassera and election of Member of Council which could only be done at a general meeting and in consequence there has been no necessity for group meetings. As regards the work done this year there has been a good deal of correspondence in the early part of the year with the U. P. A. over the change of Secretaries and rearrangements of accounts. As one of your representatives on the Council of Mysore Planters' Associations, I have attended 3 meetings, 2 in Mudigere and one in Chickmaglur at which arrangements were made with Mr. Anstead as to the control of the Assistant Scientific Officer and arrangements made for the equal distribution of the cost of the Assistant Scientific Officer between the 3 Mysore Associations on an acreage basis, which arrangement you will be asked to sanction when this subject comes up for discussion.

ROADS AND COMMUNICATIONS.—The correspondence that has taken place in connection with Toll-gates on the Hassan Road will be laid on the table. Complaints as to the state of the roads in Hassan District have been made to the Chief Engineer, but so far no reply has been received.

LABOUR.—A 'Scheme of Registration' by means of finger prints has been circulated to the members and was fully discussed at the Hanbalu meeting and copies of the resolutions thereon sent to the Secretary, U. P. A. and it was suggested that the Committee appointed by the U. P. A. should issue a progress report. This they have not yet done.

LEGISLATION.—The question of 'Title Deeds' and 'Extradition' were brought forward during our interview with the Dewan in Saklaspur; the question of a seat on the Hassan Local Board is still a subject of correspondence with the Dewan.

PLANTERS' BENEVOLENT FUND.—I should like to call attention to the fact that there is still Rs. 100 of promised subscriptions to this fund that have not yet been paid.

During the year we had the honour of a visit from His Highness the Maharaja and the Resident, Sir Hugh Daly, and a few days ago the Dewan received a deputation and gave us a patient hearing on all the subjects brought forward. We have to regret the death of Mr. Devaraj Urs who was known to many of us when Deputy Commissioner in Hassan.

In conclusion, I should like to record the great assistance I have received from our President, Mr. F. M. Hamilton, and to thank Mr. W. L. Crawford for his help and advice.

I place my resignation in your hands.

ACCOUNTS.—The accounts having been previously audited by Mr. C. Lake were passed and the budget for the coming year adopted.

RAILWAYS.—The following resolution was put from the Chair and passed unanimously:—"That this Association again place on record its unalterable opinion that any scheme of railway construction drawn up for the economic development of the Mysore Province should have as its keystone direct communication with the West Coast to Mangalore, the natural port of Mysore, and seeing that the Mysore Durbar are willing to construct their portion of the proposed line lying within the borders of that State, this Association resolves to request the Secretary, U. P. A. S. I., to bring the whole facts of the case before the Secretary of State for India, and urge upon him the necessity which exists for the Government of India, to sanction the construction of the section running from the Mysore frontier to Mangalore, a distance of about 50 miles, and that the Planting Member on the Council of Fort St. George be asked to personally bring the matter to the notice of the Madras Government."

ROADS.—Attention was drawn to several of the roads in the district and the opinion of all members present seemed to be that the bad condition of the roads was due entirely to lack of supervision and not to want of funds, and a resolution as below was passed:—"That this Association is of opinion that the Belur, Gonibede, Belur, Barguai, Balu, Kenchamanan Hoskote, Kerode roads and part of the Munjarabad-Mangalore road are in a deplorable condition and attributes this state of affairs to lack of proper and adequate supervision rather than to insufficient grants for up-keep, and that this Association do write to the Chief Engineer to make satisfactory and sufficient arrangements to ensure that repairs sanctioned by the Public Works Department be done in an efficient manner and at the right season of the year." Proposed by Mr. C. K. Pittock and seconded by Mr. C. Lake.

LABOUR.—REGISTRATION SCHEME.—This subject having previously been fully discussed at the General Meeting held at Hanbalu in November last it was proposed by Mr. S. Sladden and seconded by Mr. A. Thomson :—"That a Sub-Committee of 3 be appointed to go into and criticise the proposed 'Registration Scheme' and submit their views to a special General Meeting which shall be called before the next meeting of the U. P. A." This was agreed to and a Sub-Committee consisting of Messrs. C. K. Pittock, J. G. Hamilton and C. J. Hayward was appointed.

LEGISLATION.—GRANT OF TITLE DEEDS.—It was decided that Mr. W. L. Crawford be asked to draw up a memorandum and forward it to Government through the Association.

MEDICAL.—The Honorary Secretary was instructed to press for the early establishment of a Dispensary at Gonibede and for a greater number of Dispensaries throughout the Mulnaad. It was also noted with satisfaction that the new Dispensary at Saklaspur has been opened to the public.

SCIENTIFIC DEPARTMENT.—MYSORE SCIENTIFIC ASSISTANT.—As what seems to be a sporadic outbreak of green bug has been reported and as under these circumstances it is important that every effort should be made to stamp out the pest before it gains a further footing in Mysore; it was proposed by Mr. S. Sladden and seconded by Mr. E. W. Rutherford :—"That owing to the discovery of green bug in Mysore that the Assistant Scientific Officer's services are urgently needed to deal with the outbreak, and the Council be requested to allow Mr. Frattini to devote the whole of his time to the stamping out of the pest and his programme be altered accordingly." Mr. Frattini showed specimens of green bug to those present at the meeting so that members should know what to look for and how to identify it.

LABORATORY FOR MYSORE ASSISTANT.—The Meeting endorsed the action of the South Mysore Planters' Association members of the Council of Mysore Planters' Associations in voting for the establishment of a laboratory.

RE-ARRANGEMENT OF GUARANTEES TO U. P. A. FOR THE SCIENTIFIC ASSISTANT'S FUND.—The formal sanction of the Association was given for the alterations of the guarantees to the U. P. A. for the Mysore Scientific Assistant's Fund, rendered necessary by the re-distribution of subscriptions between the 3 Associations on an acreage basis.

RE-APPOINTMENT OF SCIENTIFIC OFFICER BY GOVERNMENT OF MADRAS.—Read letter from the Secretary, U. P. A. and copy of letter from the Honorable Mr. L. M. Wynch, C.I.E., I.C.S., *re* re-appointment of Scientific Officer.

The following resolution was put from the Chair and carried unanimously:—"That this Association wishes to place on record its gratitude to the Governments of Madras and Mysore for their assistance with regard to the appointment of the Scientific Officer for the Planting Industries of Southern India and gladly agree to continue their contribution for another period of 5 years."

JUBILEE OF THE S. M. P. A.—Mr. Graham Anderson with the incoming President and Honorary Secretary were appointed a Committee to arrange for the proper celebration of the 50th year since the foundation of this Association.

ELECTION OF OFFICERS.—The following were elected office-bearers for the coming year:—

President	..	Mr. W. L. Crawford.
Honorary Secretary	...	Mr. M J. Woodbridge.
Committee	...	Messrs C Lake, C. J. Hayward, Thiselton Anderson, A. R. Park, C. K. Pittock, and A. Thomson.

(Signed) M. J. WOODBRIDGE, *Hony. Secretary.*

CORRESPONDENCE.

Labour Recruiting in Planting Districts.

Arcadia,
Nagalur. Shevaroys,
16-4-13.

THE EDITOR,
Planters' Chronicle.

Dear Sir.—I shall feel much obliged if you will kindly publish the following facts in the next issue of the *P. C.* for the benefit of members of the S. P. A. and as a note of warning to other associations interested in the above subject.

That Mr. T. G. Daly from Burma visited Yercaud between the 1st and 12th April and put up at Fairlawns Hotel. I have been given to understand that he led people there (especially those connected with the planting industry on these Hills) to believe that he was up for a holiday. This does not appear te be quite the case, as one of our members (Mr. F. D. Short) sent me a packet containing printed Circulars in Tamil that have been widely distributed by Mr. Daly in the native localities of Yercaud and the surrounding Estates. I had one of the Circulars translated into English which I enclose. I am informed that the recruiter is now in Salem and from there proceeds to Calicut. Doubtless his Circular will prove very attractive to the cleanly Malabar cooly as far as the services of "Washerman" and "Barber" are concerned. It is a pity the Estate in question does not provide a 1st class covered in swimming bath, etc., water (of course under European superintendence)—one for ladies and one for gents—mixed bathing to be allowed only after closing a two years' agreement. This ought to fetch them by the ship-load.

I am,
Dear Sir,
Yours faithfully,
(Signed) CHAS. DICKINS,
Hony. Secy., S. P. A.

Contents of Circular.

SUJIN RUBBER ESTATE, LTD., RANGOON, BURMA.

This is to notify to all classes of people that

(1.) The Proprietors of the Sujin Rubber Estate have deputed Mr. T. J. Daly, their European Superintendent, to collect coolies from the Madras Presidency and send to them.

(2.) The above mentioned Sujin Estate enjoys a superior climate, agreeable to the health of the people and is a few hours journey from Rangoon.

(3.) Free quarters are given to coolies and the houses are built of Teakwood and are convenient to live in. There are clean drinking water wells. Able doctors examine patients and give medicines gratis. There is a hospital on the Estate. Besides this, there is a Telegraph office and arrack shops. Bazaars have been established in the Estate itself wherein rice, vegetables and provisions may be had for prices cheaper than this country.

(4.) Should advances of wages be needed to purchase provisions from the bazaar therewith they will be given every Saturday and the same will be deducted from the pay for the month.

(5) Each month's pay will be disbursed between the 10th and the 14th of the month.

(6.) Coolies who work in the Estates will receive wages as per schedule below:—

(1.)	For a day for men	8 annas.
(2.)	For youth between 14 and 16	5 annas.
(3.)	For a woman	6 annas.
(4.)	For children	3 to 4 annas.

(7.) Those who work more hours than they are required to do for the wages they get, will receive additional wages for the extra work they do at the following rates per hour:—

men 2 annas; women 1 anna 6 pies; children 1 anna 3 pies.

(8.) Agreements will be taken from the coolies binding them to work for two years. When coolies go to work they are allowed to bring children between 9 and 12 years of age to work along with men or women. They will receive wages at the specified rates besides the monthly wages. This will be of great advantage to them.

(9.) Those who give guaranteed agreements for three years are entitled to get gratis all expenses incurred for the journey from their house to the place where they have to work.

(10.) Those who give agreements binding them and their family to work will be given cost of all expenses which will be deducted from their pay in the monthly instalments at Rs. 4 for each man and Rs. 3 for each woman.

(11.) Should men or women either married or parents happen to bring with them to the Estate persons who are incapacitated for work the latter will receive monthly pay gratis.

(12.) *The services of Washermen to wash clothes and Barbers to shave are available on the Estate.*

(13.) There is a Depot at Salem for the coolies, and those who may be desirous of knowing further particulars may obtain personally from the undersigned Superintendent.

(Signed) T. G. DALY,
Supdt. Sujin Rubber Estate, Salem.

AGRICULTURAL EDUCATION IN ITALY.

By Royal decree the Higher Council of Agricultural, Industrial and Commercial Instruction in Italy was abolished in December 1911, and a Council for Agricultural Instruction substituted. The new Council is to consist of fourteen members appointed by the Minister of Agriculture, and is to give advice regarding proposed legislation and general provision for agricultural instruction, agricultural schools of all kinds, aid to students, and other questions relating to agriculture, forestry, and zootechnical studies which he may refer to it.—*Agricultural News.*

The Planters' Chronicle.

RECOGNISED AS THE OFFICIAL ORGAN OF THE U. P. A. S. I., INCORPORATED.

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THE U. P. A. S. I.

(INCORPORATED.)

Contents.

The Scientific Officer concludes in this issue his interesting report of his tour in the Travancore High Range. We cannot but endorse the Scientific Officer's recommendation that a Scientific Assistant should be appointed by the Kanan Devan Planters' Association, working under the instructions of the Scientific Department of the U. P. A. S. I. Every day brings home to us the value of scientific aid in our daily work, and the absolute necessity of it if we are to make our industries ever increasingly valuable and permanent. All over the world Scientific Colleges are being started to train young men for agricultural pursuits with marked success. We cannot but emphasize what the Scientific Officer says " a chemist with an all-round knowledge of agriculture would be a most valuable asset" and we yet hope to live to see every District Association with a Scientific Assistant of its own.

The Planting Expert after his recent visit to South Mysore contributes a most valuable article on Green Bug in Mysore. The key-note of which is to "Be Ready" and that there is no cause for panic if planters will only take the most elementary precautions to check the disease on its first appearance; but to do this they must "Be Ready" and we trust that every planter will read and digest this most valuable paper.

An interesting article on Manurial Experiments with Tea is published. From the varying nature of soils and climate it is impossible to lay down any definite rule. This must be the result of experiment and locality, but it is justly laid down that soil analysis should be the basis of such experiments.

An estimate for developing a 1,500 acre estate under rubber in Ceylon is printed, and it would be interesting to compare it with the cost of same in Southern India.

An article about the School of Forestry at Cambridge University is reproduced as showing the infinite value of training in every walk of life where scientific knowledge is necessary. The School of Forestry has more than justified its existence.

Scientific Officer's Papers.

CXVII.—REPORT ON A TOUR IN TRAVANCORE HIGH RANGE.

(*Concluded.*)

OTHER CROPS BESIDES TEA.

Though Tea is the main crop grown in the district several other products are cultivated, and I had the pleasure of seeing something of these.

There appears to be a small area of Coffee still existing and this gives fair crops. I saw a little Ceara Rubber but was unable to visit the Hevea Rubber Estates. The Ceara has made good growth and is, I understand, tapping out well and yielding a sample of rubber which is fetching big prices. In all probability. it would be a good policy to plant up a sufficient acreage of this product in the neighbourhood of Chattamanar and places with a similar soil and climate to employ a factory with machine driven rollers, &c.

An interesting experiment on a large scale was being tried with Camphor on one estate which I visited. and encouraging results were being obtained. With some slight alterations in the still the yield will probably be considerably increased. Use should be made of the dry fallen leaves, as these on distillation yield a high percentage of camphor. The trees were making a rapid growth, especially upon jungle soil, and will soon supply very large quantities of clippings. Probably the best way to cultivate camphor will be to grow it in big hedges kept clipped to a convenient height of 5 or 6 feet and not to allow it to form a tree. It is apt to be attacked by Pink Disease (*Corticium javanicum*), the same bark disease which attacks Hevea Rubber, and this was the case on this particular estate. The Bordeaux mixture treatment is not practicable in the case of this crop and so the diseased branches should be cut out and burned as soon as ever they make themselves apparent at the beginning of the dry weather, and an attempt made to remove them before spores are formed and distributed by the wind.

In some places large areas of Sisal are being put down but this has not yet reached a stage where it is big enough to cut. Fibre is being extracted from a somewhat older experiment plot in Coorg and it will be interesting in the future to compare the two if the respective owners will be good enough to supply figures.

With the gradual but constant demand for a supply of good commercial vegetable fibres, whether for textile, ropes, cordage or other purposes. there would seem to be a promising future for so valuable a fibre plant as the Sisal Hemp. This plant furnishes the commercial and well-known Sisal Hemp from its leaves, and has been in recent years somewhat extensively cultivated in South America, Hawaii, as well as in British, German and Portuguese, East Africa.

EXPERIMENTS.

A number of different experiments were discussed and arranged, while I was in the district dealing with the following points, Manuring of Tea, Green dressings, Growth of plants and use of prunings to prevent dry wash, freeing tea stems from moss. If these are carried out they should provide some very interesting information in future years. It was also arranged to experiment with some new varieties of Eucalyptus trees as fuel reserves. The Red Gum appears to grow very rapidly and well in the district, but it is by no means proved that this is the best possible fuel tree and it is well worth while experimenting with other varieties.

MISCELLANEOUS.

A considerable amount of damage is caused to Tea in some places by frost, especially in damp hallows. In this connection it is of interest to note that the vine growers in some part of the world protect their vine-yards from frost by means of the dense smoke produced by a large number of smudge fires which are kept ready round the vine-yards and lighted when frost is likely. It might be worth while experimenting in a similar way in some of the places which are annually damaged by frost.

At the Annual General Meeting of the District Planters' Association held on the 1st June, 1912 there was some discussion on the sale of Tea Fluff. I would call attention to the fact that this bye-product has proved to be a valuable form of manure especially for Roses, and that it is possible some special sale might be found for it to Horticulturalists and thus do away with the danger of its being used as an adulterant. An analysis of this material will be found in the *Chronicle* VIII, p. 51.

I was given specimens of an interesting curiosity found at Yellapatty known locally as 'the food of the gods.' This consists of very hard tuber-like masses of vegetable matter dug out of the soil which on being broken open present a grained surface somewhat resembling rice. The legend has it that these masses are rice which a god squeezes up in his hand (the shape of some of the masses supports this, fitting the fingers of a hand closed on it) and throws down from the tops of the hills. Should anyone eat this 'food' it produces a bad headache, but apparently conveys no particular benefits.

It struck me that these masses were probably of fungoid origin and so I sent some specimens to the Government Mycologist who writes of them that they are sclerotia of some fungus extraordinarily large and hard. It would be of great scientific interest to trace the connection between these sclerotia and the fungus producing them, which is probably to be found during the monsoon.

SCIENTIFIC ASSISTANT.

The district being large, but compact, is eminently suited for a Scientific Assistant of its own on the lines adopted by Coorg and Mysore and I earnestly recommend the District Association to seriously consider whether they cannot see their way to appoint one. A chemist with an all round knowledge of agriculture would be a most valuable asset. He could study the problems briefly discussed in this report on the spot, and if manuring has to be adopted in the near future would be invaluable in making soil analyses and recommending manures and checking their purity when they were purchased. Such a man could probably overcome the difficulties which at present arise in matters like Ratin, and there is the big subject of the manufacture of Tea left practically when Dr. Mann left it and crying aloud for further study. An Assistant of the right type would probably pay for his salary and his laboratory in a very short time.

CONCLUSION.

In conclusion I desire to express my gratitude to the Hony. Secretary and Chairman of the Kanan Devan Planters' Association for the generous aid they gave me in reaching the district and carrying out a tour in it, and also to Mr. H. L. Pinches and many others for the great kindness and hospitality they showed me throughout a most delightful and enjoyable tour among some of the finest scenery it has been my good fortune to see in South India.

RUDOLPH D. ANSTEAD,
Planting Expert,

THE SCIENTIFIC DEPARTMENT, U.P.A.S.I.

GREEN BUG IN MYSORE.

In recent issues of the *Chronicle* it has been mentioned that Green Bug (*Lecanium viride*) has made its appearance on the Coffee on certain estates in South Mysore in the Saklaspur district, and no doubt, those who have seen the results of the ravages of this pest in Ceylon, the Pulneys, and Nilgiris will view this outbreak with the utmost alarm. In his account of the pest in Ceylon, Green says, "the insect being an inconspicuous one by reason of its colour and small size it was not noticed till it had established itself in sufficient force to defy all efforts at extermination." In the Pulneys and Nilgiris it is admitted that for many years nothing whatever was done to check the pest, and consequently it got such a hold that the Ceylon experience was practically repeated. In this present case, however, matters are very different. The sporadic outbreak has been discovered at once, and it was most wisely at once reported to the Scientific Department, and with their help it was at once dealt with. The consequence is that wherever it has appeared it is now well under control and at the time of my visit of inspection there was little to be seen but the places where it had been. In my opinion there is no need whatever for any kind of panic or even pessimistic alarm. The planters are fully alive to the danger of the pest, and they are keeping a sharp look out for it, the estates getting a constant tree to tree inspection and directly any signs of it is found it is reported and measures of control are at once adopted. Under such circumstances it is impossible for this pest to establish itself beyond control. The only danger is that it may be neglected on some particular estate either because it is not noticed, or from what the Chairman of the South Mysore Planters' Association so aptly terms 'cynical indifference.' This possibility is being guarded against as far as possible, and the Mysore Agricultural Department have kindly promised to co-operate with the Scientific Department of the U. P. A. S. I. in stamping out the pest should it appear on the estates of Indian planters. So far from the pest being unrecognised and neglected in this case, the district appears to be swarming with scientific men; the Mysore Scientific Assistant, the Coorg Scientific Assistant sent post haste to see what the pest looks like, and how to treat it, the Planting Expert inspecting the work done, and only a temporary illness prevented Dr. Coleman, the Director of Agriculture for the Mysore Government also turning up on the spot. In fact the South Mysore planters appear to be threatened with a sporadic outbreak of scientific men, which may possibly be worse to endure than green bug, but at any rate it should lead to a feeling of confidence and remove that needless spirit of panic of which there were some signs at first. So long as planters will keep a careful watch for the first appearance of the pest, and *be ready to deal with it* when it appears, there is no danger of the pest, becoming more than a nuisance, but on the other hand if it is neglected we have seen in Ceylon and elsewhere what it is capable of.

The plan of action adopted to deal with the outbreak is the following:— As soon as it is found to be present on an estate, a tree to tree inspection is made and the infected area defined. As a rule one particular area will be found comparatively badly infected, that is almost every tree in it may have scale, and outside this only one tree here and there will be found with scale. It has probably been carried by birds to these isolated trees which should be dealt with drastically. The first thing to do is to prune the trees in the infected area so that they can be sprayed effectively. As much of the bug is cut off as possible, cutting the trees right back if necessary, and even in really bad cases removing all the leaves and young wood. The bug infected material removed from the trees is put into sacks on the spot and carried out into the nearest convenient open space and *burned*. Coolies doing this work should not be allowed to pass through uninfected coffee or they will spread the scales, which cling to their cloths. In fact no one should be allowed to go straight from the infected area to clean coffee on the same estate or any other estate. Having cut off as much bug as possible, the stems and primaries of the trees are scraped and cleaned with a little lime water and then the area is thoroughly sprayed. The best mixture to use is one pound of Rosin, one pound of Washing Soda, and one pound of Soap. The Rosin is powdered as finely as possible and mixed with the Soda and a little water and the mixture boiled slowly. As it boils up a little more water is added from time to time and it is kept well stirred till it is all dissolved to a clear liquid. The soap, which has been shaved, is next added in small doses at a time and the mixture boiled with constant stirring till all is dissolved. It is then cooled and the volume made up to four gallons and this used as a spray applied through a mist nozzle from some form of sprayer.

At the same time as the coffee is pruned and sprayed as many ants as possible must be destroyed and the nests of the Red Ant and the little Black Ant which runs about with its abdomen curled up over its back found and burned. These ants carry the scales about and distribute them and tend them as man tends cattle. During the monsoon the ants protect the scales and if the nest of the Red Ant is examined during the monsoon it will be found full of young scales. As soon as the monsoon is over the ants bring these out and place them on the Coffee trees.

The process of pruning &c., will have knocked off a large number of young scales on to the ground and mulch, and these will be able to regain a position on the trees; so as soon as spraying is finished the roads should be swept clean and all the mulch buried cleanly to a depth of about three inches with a good dressing of Lime. At the same time the boundaries should be carefully examined for the presence of scale on shrubs and weeds and kept cut back and clean.

About a week after spraying another careful inspection of the infected area should be made and if any fresh scale is found the trees should be sprayed again. The object is to kill all the scales in a young stage before they can produce eggs and young, and thus eradicate the pest.

The scale flourishes best in fine weather interspersed with light showers, and it is usually at its height from the middle of March to the middle or end of May when the monsoon checks it, *but the monsoon only checks it and does not kill it or eliminate it entirely.* The heavier the monsoon the more the scale will be checked, especially if its parasitic fungus is present, but it will not entirely remove it. It begins again about September and goes on spreading rapidly till January when the drought may check it again to a certain extent until March. Therefore, at the end of the monsoon, when the fine weather comes another inspection must be made, and if any trace of scale is found another spraying must be done. An after monsoon manuring also to put vigour into the trees is a good plan.

These are the means which are being adopted in the infected area and if they are whole-heartedly carried out there is no reason why the scale should not be kept in bounds and under control, if not eradicated. Its eradication largely depends upon its method of introduction, and on this point it is difficult to come to a definite conclusion and nothing is as yet proved. A rumour is afloat that it has been introduced on manure bags. This, however, cannot be proved and it seems to me unlikely. I should expect the majority of manures to act as insecticides, and I cannot imagine a scale living for any length of time on a manure bag. It is *possible* but not probable. Messrs. Stanes & Co., hearing of the rumour which they consider calculated to do harm to their business have written assuring me, "that not a single bag in which manure has been supplied is a crop bag. All the bags in which we pack manure are procured from Madras or Calicut and are bags that have been used once for packing common salt in. The manure works are situated a mile from the coffee curing works and they have no connection with each other." I have much pleasure in giving publicity to this statement and until proof is produced that manure has been sent to estates in crop bags, and that this is a possible means of importing green bug, credence cannot be given to the theory.

One way in which it can be introduced is on plants from Bangalore and other places. About a year ago, it was actually introduced on a coffee estate in this way but luckily it was discovered in time and destroyed. In a recent report on a tour in Mysore the Government Entomologist said, "when touring by rail I often see at railway stations consignments of plants and young trees (mangoes, &c.,) being sent by rail and it is very rarely indeed that I am unable to detect some scale insects or other pests being carried with them." In this particular instance I was unable to trace the infection to this source, but I think it quite probable that at most places along the railway line such as Arsikere, Kadur, &c., a search would reveal the presence of Green Bug on the trees. From these centres it spreads, carried naturally by wind, birds, &c., and in bandies on branches &c. In all probability it will be found upon investigation that it has reached the neighbourhood of this particular group of estates on the jungle and that the infection is coming in from that jungle. On this point the Scientific Department of the U. P. A. S. I. will welcome the assistance of all planters, and of the Agricultural Department of the Mysore Government. If the nearest point of infection can be found, some steps can be taken to clean up the jungle, or isolate the estates from future danger of infection. In the meanwhile all estates owners, both European and Indian, should keep a most careful watch for the appearance of the scale on their land and should they find it, report it at once and take immediate steps to deal with it.

This leads to another most important point, *the necessity of being ready*, to deal with the pest immediately it appears. Despite frequent warnings in the *Chronicle* and elsewhere given by the Scientific Department from time to time this present outbreak found the planting community entirely unprepared. No one had sprayers or insecticides ready, and a lot of valuable time was wasted before the former could be procured in quantity. Indian firms do not stock these things and only three sprayers were available nearer than Calcutta. Once more I would impress upon individual planters the necessity of possessing at least a sprayer or two. As long ago as January 1911 the following note appeared in the *Chronicle* (VI. p. 47); it fits the present situation so exactly that further comment is unnecessary.

"*Be ready!*—A short time ago I was looking through some old files and came across a lecture to Ceylon planters by the Government Entomologist. The cap fits some South Indian planters so exactly that I cannot resist reproducing the following extract:—

'I wish particularly to draw your attention to the importance of being prepared for any emergency, such as the sudden appearance of a dangerous pest. How many of you possess even a single spraying machine or a powder-distributor, or any stock of even the simplest insecticide? If there is a sprayer, it is probably poked away in some out-of-the-way corner and never looked at. If suddenly required, it is found that the valves have gone wrong, or the rubber tubing has perished, and it has to be sent to Colombo for repair just when it is most urgently needed! The machine when not in constant use, should have clean water pumped through it at least once a fortnight, and after use with any insecticide. it should be carefully washed out with (preferably warm) water before being put away. The machine might be kept in order by using it for watering the ferns or flower beds when not required for more serious work. Every single estate should possess at least one good sprayer and a powder-distributer. Then at times of any serious local outbreak co-operative measures could be quickly undertaken.

'Then a supply of some of the simpler insecticides should be kept on every estate, ready for an emergency, just as medicines are kept for cases of sudden sickness amongst your coolies. Every estate has its supply of such simple drugs as chlorodyne, santonine, quinine &c. Why should you not be equally prepared with kerosine emulsion, sulphur, Bordeaux mixture, and arsenical preparations, against diseases of your plants? What is usually the course when an insect pest shows itself? To begin with, it has probably been on the place for some time before it has been observed; another three or four days go by while specimens are being forwarded to the Government Entomologist and his reply and recommendations received. Then, if any special treatment is required, it is as likely as not that an order has to be despatched to Colombo for the necessary material, resulting in a loss of another week before action is taken when every day at the commencement of an attack is of the utmost importance. In dealing with insect pests, the proverbial "stitch in time" will save not only 9 but 999, and make indeed the difference between success and failure. The early observation of any pest is a point that should be attended to. Encourage your coolies and kanganies to report (and bring specimens of) any insect found upon the tea. Presume that every such insect is an enemy until you have assured yourselves that it is harmless.' "

RUDOLPH D. ANSTEAD,
Planting Expert.

UNITED STATES OF AMERICA (HAWAII).

RUBBER PRODUCTION.

Rubber is steadily becoming a more important item of Hawaii's products. On the Island of Maui many trees have been planted, and these are now being tapped in large numbers. Steady efforts are being made to improve the methods of preparation in order to increase the marketable value. 35,000 trees were tapped during 1912, and altogether some 8,000 lbs. of rubber were expected to be produced, most of which will be exported. For 1913 an output of 20,000 lbs. is anticipated.

Attention has been directed to an indigenous rubber tree (*Euphorbia lorifolia*, which grows in several localities, one place in particular on the island of Hawaii having 6,000 acres averaging 75 trees to the acre, whose product is 14 to 17 per cent. of rubber and 60 per cent. of resin (chicle), It is reported that the latex contains 42 per cent. of solid material, and that one man can collect 16 to 30 lbs. of crude product per day.—*The Board of Trade Journal.*

TEA.

Manurial Experiments with Tea.

The results of manurial experiments with Tea carried out at Heeleaka were published some time ago, and in the *Quarterly Journal of the Indian Tea Association Scientific Department* IV. 1912 Dr. Hope discusses some results recently obtained in Assam.

In Southern India some estates have applied manure to their Tea and during the next ten years a great many more will find it necessary to do so. The best manures, and combination of manures, must be discovered by systematic experiments and though the fertilisers found most suitable for Ceylon and Assam soils may not prove equally suitable for the soils of Southern India, still it is of interest to note what results have been obtained in these places as likely to indicate at any rate the broad lines upon which experiments are likely to be successful.

Lime.—The authors of the paper mentioned above say:—"Attention has recently been drawn to the probability of lime proving a more valuable manure for tea than was at one time supposed." This idea has received support from the results of experiments made with it. "It should be remembered that lime like other manures will only have a beneficial effect when applied to soils for which it is suited and in correct quantities. In considering the manurial value of lime it must first be borne in mind that the tea plant does not require a soil rich in lime. This is obvious from the fact that practically every tea soil in the North East Indian tea districts is poor in lime, those of the Assam Valley being particularly so, the average amount for the Sibsagar district being approximately 0'04% and for the rest of Assam but little higher." This is also a typical feature of the tea soils of Southern India. "The benefit of lime on tea is due to its action in remedying some defect in the state of the surface soil. Such defect is probably due to the condition of activity of the soil bacteria, as the result of the absence of sufficient carbonate of lime to correct sourness of the soil. The cause of this insufficiency of carbonate of lime is to be found in the effect of heavy rainfall on cultivated soil which is fully exposed to the weather."

Several experiments with lime are quoted, on heavy clay soils, on black soil in which tea grows poorly with a shallow root system, and on low lying soil. In all cases a decided benefit was obtained both when lime was applied alone and when it was mixed with other manures, the most striking result being obtained on the first class of soil where in one instance a plot which received seven maunds of lime per acre gave 15'99 maunds of tea per acre while the check plot which received no lime only gave 9'47 maunds of tea per acre.

Nitrolim.—To quote the report, "at the present time comparatively few figures are to hand to show what the value of nitrolim as a tea manure is for different soils, but many experiments with this manure are likely to be made in the future in view of the fact that this is the cheapest nitrogenous manure on the market if the value of different nitrogenous manures be gauged by comparing their relative prices per unit quantity of nitrogen. If it can be shown that this manure gives as good or better results than other nitrogenous manures when applied in quantities which will provide the same amount of nitrogen it would obviously be the most economical manure to use."

Experiments do not, however, prove this altogether and better results appear to be obtained from the application of oil cakes, but probably the best results have not yet been recorded with nitrolim. "One decided advantage which nitrolim has over other nitrogenous manures is that it is alkaline in character since it contains an excess of lime."

Organic Matter.—The importance of replenishing the organic matter which has been lost to the soil by repeated cultivation and constant exposure is emphasized. The best way of supplying organic matter to tea soils is through the medium of green dressings. "In cases where cattle manure has been found to give good results the addition of a considerable quantity of organic matter rather than of nitrogen, potash, and phosphoric acid, may be looked upon as the cause of the improvement.

Potash.—The authors state:—"It is probable that the value of potash manures for North East Indian tea soils may lie in their effect upon the quality of the leaf. This seems to be indicated by the figures obtained, though a matter of this kind cannot be decided by a single experiment. Further investigation should be made in different districts under conditions which would permit of inferences being drawn as regards the effect on quality. Except in special instances the results of potash manuring in increasing yield of leaf have been poor, particularly in Assam."

Nitrogen.—A number of experiments with different nitrogenous manures by themselves and in combination with wood ashes and other materials are discussed. One point that is brought out is the value of phosphoric acid when present in these combinations, both as sterilized animal meal and basic slag. Mustard cake gave favourable results at Heeleaka and some Assam experiments are described which show that the right quantity to use is a smaller application than five maunds per acre.

"Other experiments have shown that a soil after receiving repeated dressings of oil cake failed to produce an increase of crop and in some cases the crop even decreased. An application of lime to such soils has restored the fertility."

The article under review closes with an account of some systematic experiments made on a red sandy loam deficient in nitrogen (0·02%). The most successful plot was the one receiving most nitrogen and the order of merit of the plots was in direct ratio to the amount of nitrogen supplied. The authors sum up these results as follows:—"In the year following the application of the manures the increase was maintained best on those plots which received the greatest amount of insoluble nitrogenous manure, in this case oil cake. It will also be noted that in this particular instance the oil cake was almost as quick acting as the soluble manures. A plant when growing will assimilate a certain definite quantity of food material, which is governed by the nature and growth of the plant. Any deficiency in one constituent will react to produce less assimilation of any other constituent. On the other hand, if the food materials are in excess the plant will assimilate as much as it requires, the rest will remain as an excess in the soil, and this, if of a soluble nature, will be carried away to a greater or lesser extent according to the mechanical nature of the soil, and the movements of soil water. In the case under consideration it appears that a considerable amount of the soluble nitrogenous compounds have been removed by wash. The result has been that the plants have been able to utilise the nitrogen slowly rendered available from the insoluble compounds more completely that from the more soluble nitrogenous manures."

Similar manurial experiments with tea are badly needed in Southern India based upon soil analyses. The present system of hit or miss is scarcely likely to lead to the best results.

R. D. A.

RUBBER.

The Necessity of Using Machinery on Rubber Estates.

BUY AT ONCE. DO NOT WAIT; BECAUSE A BETTER MACHINE *May* BE INTRODUCED LATER.

"Every effort must be made by planters to ship their rubber as uniform as possible in quality, and to maintain an even grading," Thus write Messrs. Gow, Wilson in their Annual Report. In this way it will be possible to deal with a much larger proportion of the crops by private treaty for near and future delivery, thus keeping the auctions within reasonable bounds. Visiting agents and managers generally would be well advised to bear in mind the great importance of this standardizing and grading on all estates.

"The large amount of supervision (preferably European) required in the factory to maintain efficiency does not appear to have been sufficiently appreciated in the past, and many estates have been rather *too much inclined to await the development of some possible new process before installing adequate machinery*, which would most probably be required in the future, whatever new methods might come into use.

"The preparation of rubber generally has continued to make satisfactory progress, and it has been proved that the physical properties of the best prepared samples are fully equal to any other kind of rubber.

"Crêpe and smoked sheet still form the two principal and best descriptions manufactured. In the earlier part of the year the former was in most request, and on the average realised the best prices, but partly owing to the comparative shortage of first quality smoked sheet, this kind has since come into very strong demand, realizing a premium over all other sorts.

"A very large proportion of the whole crop is shipped in the form of crèpe, but as the premium lately ruling on smoked sheet will inevitably cause a large increase in its production it seems unlikely that that premium will be maintained.

"The smoking process has many points to recommend it, especially as regards the strength and durability of rubber so treated. Up to the present this particular preparation has been a more cumbersome one and has taken a considerably longer time than that of crèpe. Also unless the smoking and drying have been very carefully and thoroughly carried out, the rubber is sometimes liable to arrive in a moist and mouldy condition."—*Tropical Life*.

RUBBER ESTATE DEVELOPMENT AND ITS COST.

We are indebted to Mr. Herbert Inglis, the well-known Kalutara planter, for the following estimate (in reference to the question raised in our columns lately) of what he considers would be cost of developing a rubber estate of 1,500 acres for two years before it comes into bearing. A motor-car would not be necessary. The cost is set out as follows :—

	Rs.			Rs.
Superintendent's Salary at	800	a month	...	19,200
Assistant's Salary at	250	,,	...	6,000
Director's Fees	4,000	a year	...	8,000
Office Expenses	3,000	,,	...	6,000
V. A.	1,000	,,	...	2,000
Medical Fees	3,000	,,	...	6,000
Sundries, Clerk, etc.	1,250	,,	...	2,500
Bungalow and Lines	—		...	20,000
Furniture	—		...	2,500
			Total Rs...	72,200

—*Ceylon Times*.

SELECTED CUTTINGS.

School of Forestry at Cambridge University.

The best and most lasting tribute to Mr. Henry's work in connection with the School of Forestry at Cambridge lies in the fact that, although it was only established seven years ago, it is already a flourishing institution and of acknowledged efficiency. As the following brief account of the curriculum illustrates, this success is due primarily to the prominent place which practical forestry takes in the course of studies:—

Instruction in Forestry was instituted in the University of Cambridge in 1907, when a Forestry Committee of the Board of Agricultural Studies was formed, and Mr. Augustine Henry was appointed Reader in Forestry.

The course of study for the Diploma in Forestry may be summarised as follows:—Candidates for admission to the examination for the diploma must have (1) obtained the degree of B.A., (2) passed qualifying examinations in Botany, Geology, Physics, and Chemistry: and (3) attended for two years courses of instruction in Forestry and cognate subjects.

The course for the first year includes lectures and practical work in Forest Botany, Silviculture and General Forestry. During the long vacation the student spends ten weeks on a British woodland estate in practical work under the superintendence of an experienced forester.

The course for the second year includes similar instruction in forest management and forest untilisation, and in diseases of Trees and Timber, Timber, Forest Zoology, Surveying and Engineering. During the long vacation of this year the student has ten week's practical work in a Continental forest under the superintendence of a State forester.

The total fees for instruction in Forestry for the diploma course at the University amount to £9-19s.-6d. The fee for admission to the examination for the diploma is £2-2s. The student in addition incurs the expenses, which are variable, of instruction during the two long vacations in British and Continental forests.

An elementary course in forestry has been established for agricultural students, who are now encouraged to take forestry as an optional subject in the examination for the diploma in Agriculture and for the B.A. degree in Agricultural Science. This elementary course is identical with the first year's course for the diploma in Forestry.

The woods used for the purpose of demonstration are all privately owned, and lie in the neighbourhood of Cambridge and in the adjoining countries. Visits are made to private woods and plantations, including the Botanic Gardens at Cambridge, weekly during term time, and afford an opportunity of seeing every type of woodland in the Eastern Counties of England, and of study of many forestry operations.

There is no land at present under the control of the Forestry Department, but certain experiments have been carried out by the Reader and by the Lecturer on Timber, with the assistance of private owners interested in Forestry.

A large collection of specimens, about 1,900 in number illustrative of Timbers, Forest Botany (exclusive of Herbarium specimens) and diseases of Trees, has been made. The timbers include not only home-grown species, but also examples of most of the important trees of India, China, Japan, and North America. The timber collection is unrivalled for its variety and illustrates many problems of Silviculture.

A forestry building, which will comprise laboratories, workshop, lecture rooms, and museum, will be erected during the present year at a cost of about £5,000. Funds for building and equipment amounting to over £4,500 have been provided by private benefactors. In addition, the Development Commissioners have sanctioned a grant of £2,500 towards the building, so that the Forestry Committee has now at its disposal about £7,000 for building, equipment and maintenance.

The Board of Agriculture and Fisheries having provided from the Development Fund £500 a year for two years for Research Work on Timber, the Forestry Committee have appointed Mr. E. R. Burdon, M.A., Investigator in Timber for two years from January 1, 1913, and Mr. A. P. Long, B A., Assistant Investigator for the same period.

The Development Commissioners have also sanctioned a grant of £500 a year for three years for Advisory Work in twelve counties in the East of England, comprising Middlesex, Hertfordshire, Essex, Northamptonshire, Bedfordshire, Huntingdonshire, Northamptonshire, Rutlandshire, Cambridgeshire, Suffolk, Norfolk, and Lincolnshire. An Adviser in Forestry, Mr. C. Hankins, has been appointed by the Forestry Committee for a period of three years, from April 1, next.

The training of Probationers for the Indian Forest Service began at Cambridge in October, 1911. The Forestry Committee, in consultation with the Director of Indian Forest Studies, issued in January, 1912, special regulations for the additional course of study for Indian Forest Probationers, which is required by the Secretary of State for India in Council. In connection with the training of the Indian Forest Probationers, Mr. H. Jackson, Conservator of Forests, India, gives courses of lectures in Indian Forestry and Forest Law.

The Forestry Department is supported in part by annual subscriptions from the County Councils of Northamptonshire, Norfolk, Cambridgeshire, West Suffolk, and Huntingdonshire by a Government Grant from the Board of Agriculture and Fisheries; and during the past year ten of the Cambridge Colleges, Clare, Pembroke, Gonville and Caius, Trinity Hall, King's, Queen's, Christ's, St. John's Trinity, and Emmanuel, have also contributed.—*The Gardeners' Chronicle.*

SOUTH AFRICA.

Registration of Fertilisers.—With reference to the notice on pp. 402-3 of the "Board of Trade Journal" of 23rd November, 1911, and to previous notices relative to the importation and registration of fertilisers in the Cape Province, H. M. Trade Commissioner for South Africa (Sir R. Southern Holland) has farwarded a copy of an official notice which has been issued to importers in South Africa calling their attention to certain points regarding the registration of fertilisers. Importers are reminded that the practice of re-registering any particular consignment that may vary slightly in chemical composition from that originally registered for that particular brand is liable to lead to confusion, and that in future the authorities will not accept concurrent registrations of this nature. If the difference in composition is, so great that the original registration will not serve, the new article to be registered must have some distinguishing title, such as, "Quality A" added to its name. If this is not done the original registration will be regarded as cancelled, and all fertilisers sold under, or bearing, the brand concerned will be regarded as governed by the last registration, and the importer will be held responsible accordingly.—*The Board of Trade Journal.*

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Contents.

The Scientific Department publishes an interesting contribution on "Mosquito Blight" and the methods used to get rid of it and in connection with spraying tea bushes for killing insects a good insecticide called Vermisapon recommended by Mr. Munwell Lefrey, the Imperial Entomologist, is printed. It has been used with success and can be procured in Calcutta.

The Scientific Department draws attentton to a valuable article contributed by Mr. P. M. Wilkins called "Coffee Manuring on a Scientific Basis." The article should rouse general interest, not only amongst coffee planters but al interested in soil cultivation showing how increased returns and profit can be earned by judicious manuring under Scientific advice. The figures given by Mr. Wilkins are a revelation and his introductory remarks on the all round improvement of his estate and coffee, are startling and conclusive as to the value of scientific advice, whole-heartedly carried out. By permitting his report and tabular statement to be published in the *Chronicle* Mr. Wilkins merits the thanks of the whole Planting Community.

The proceedings of the Nilgiri Planters' Association are printed. The Honorary Secretary in his report refers to an unpleasant incident, of a Ceylon Tea makers once was in his employment, who on his return to Ceylon attempted to crimp some of the Honorary Secretary's coolies. The matter was represented to Ceylon Planters' Association and through them to the would-be crimpers employer who *at once* dismissed him from his employment. The thanks of the Planting Community are due to the employer and to the Ceylon Planters' Association for their prompt treatment of this case. We are confident that all cases of a like nature if brought to their notice will receive the same prompt and courteous consideration from the Ceylon Planters' Association. It is a pity that all irregular and unauthorised recruiters cannot be treated in the same way.

From the *Agricultural News* is reproduced an interesting article on the variability in the quality of seeds, especially referring to the Tropics.

THE SCIENTIFIC DEPARTMENT, U.P.A.S.I.

Mosquito Blight of Tea.—Mosquito Blight (*Helopeltis*) is a very serious pest in several of the Tea growing districts of Southern India and causes a considerable amount of damage. Three years ago a number of experiments were begun with methods of dealing with it, information was published in the *Chronicle* with regard to Mr. Antram's methods of spraying, &c.„ (V. pp. 170, 181), and the Planting-Expert wrote a good deal about it in his tour reports on Tea districts. A planter who has carried out some systematic work with this pest kindly sends for publication a digest of the methods he has used with complete success. Three years ago when I visited his Estate I found that the pest was very bad indeed and now he reports that he has practically got rid of it. The following were the methods used:—

" 1. Put small children on to catch the mosquito and collect the eggs. This should be done all the year round as it is most important.

" 2. Prune the Tea in the monsoon or dry weather, but not in showery weather.

" 3. Bury all prunings with Basic Slag at the rate of about 300 lbs. per acre. Holes one to every four trees in alternate lines. This costs about Rs.18 per acre.

" 4. Have all ravines cleared.

" 5. Cut out all Cinchona and all the Etha jungle.

" 6. If the boundary of the Tea is jungle, fell the same one chain back and plant up fuel trees, not Gums.

" 7. Care must be taken when pruning that mosquitos do not fly into the next field. On the windward side burn leaves and some prunings so as to make a heavy smoke.

" 8. Moss and clean the bushes after pruning.

" 9. If mosquito returns after pruning spray immediately with Tobacco juice.

" 10. Cultivate as much as possible with bulk and Dadap manuring. I find these very effective.

" These are the methods I have tried and I am practically quit of the pest, although as you know I had the pest very badly when you were here some three years ago, and in parts abandoned Tea on account of it. I previously tried burning prunings through the tea and piled on the bush, but with no success. I cannot give you individual cost of works, but at the most it would not cost more than 3 cents per lb. made tea excluding the Slagging."

This is most valuable information and as a pratical result worth pages of theory and suggestions. Would that we had more of this kind of information coming in about other pests and diseases. Tea planters troubled with Mosquito Blight cannot do better than give these methods, which have proved successful, a thorough trial.

Manurial System.—Planters often write to this office asking me to recommend them a manure for their coffee, or what I consider the best manure for coffee at a reasonable figure. It is almost impossible to recommend a manure without any further data to go upon. Of course one can make up a formula for a good general fertiliser which will probably have some effect upon any crop and in any kind of soil, but that is not the way to manure coffee or any other crop. I believe in systematic manuring where different manures are applied each year and each application bears a definite relation to that applied the year before and that which will be applied the year following. The results obtained on one estate from such a system are given in this issue of the *Chronicle* and they speak for themselves. The basis of such a system is a soil analysis and wanting this one must at least know something about the nature of the soil, whether it is light or heavy, sand or clay, about its previous treatment, what manures have been applied to it, its present condition of tilth, the kind of shade and mulch, the elevation and rainfall and so on. Most of all it is necessary to know what crop is cultivated: enquiries about suitable manures have before now been asked for and this important detail omitted.

Green Bug in Mysore.—Information has been received from an estate in the affected district that hand plucking has been finished and no more trees have been found to be infected, which shows that the outbreak is under complete control. Spur pruning of all trees that the hand plucking had shown to be very badly infected has also been finished and these trees have been lime washed. The blossom interfered with spraying, but now that this is over spraying operations have been begun. It is reported that the spray recommended, the rosin, soda, soap mixture, kills the scale effectually but the amount of spray mixture required to treat big unpruned trees is large, probably 100 to 150 gallons an acre. This can be reduced to about 80 gallons per acre on the pruned patches. Trees which have not been pruned for years are going to be a trouble as they always carry a lot of long sickly wood which the bug attacks, and they are very difficult to spray, as this kind of tree is matted with cross wood. This is a great objection to the non-pruning system which in some places has become popular. It may be all right when no disease is present, but in the case of an attack of a pest like Green Bug it gives trouble. It is almost impossible to spray an unpruned tree effectually, and for this reason pruning was the first thing recommended in dealing with this outbreak so that the affected trees could be got at with the sprayer.

Protection of Birds.—Some time ago a paper on this subject was published in the *Chronicle* (Vol. VI. p. 330) showing how the trade in feathers was rapidly leading to the extinction of some species of beautiful and useful birds, and that apart from the cruelty practiced in the collection of feathers, the matter was an important one for the agriculturalist. Those who have this subject near at heart will find the following note which appeared in *Nature* of 20th March of interest:—

"At the twenty-second annual meeting of the Royal Society for the protection of Birds, held at the Westminster Palace Hotel, on March 6th, Lord Curzon, as reported in *The Times* of March 7th, strongly deprecated the continuance of the practice of wearing feathers (other than those of birds used as food) by ladies, and referred to the appalling slaughter of certain kinds of birds of brilliant plumage." In 1911 his lordship stated that in three sales in London no fewer than 41,000 skins of humming birds, 20,700 of birds of paradise, and 129,000 egret plumes were sold. After adverting to the fact that the egrets are killed while in the breeding plumage, and that certain species or races of birds of paradise are reported to have been exterminated by the plumage-hunters, the speaker observed that although much had been done to stop the trade, yet there were weak lines in the prohibitory chain, among these being the lack of prohibition of the import and sale of feathers and skins in this country."

R. D. A

PLANTERS' PAPERS.

VI.—Coffee Manuring on a Scientific Basis.

I think the results obtained from 3 years' cultivation and manuring according to a scheme proposed by our Scientific Officer, Mr. R. D. Anstead, should be of interest to all readers of the *Planters' Chronicle* interested in coffee, and I may say, of advantage. Like many other fellow planters, year after year I applied manures, usually nitrogenous, and in the usual style. My 50 acres of bearing coffee on one estate, and 100 acres on another, replied to my best efforts with crops of 5—6 tons on the former, and 14—15 on the latter. From 1902—1910 the former averaged 5 tons, and the latter 14½ tons for 8 years. The manures applied averaged 4 cwts per acre, consisting mainly of Poonac, with bone added occasionally, and in other years fish. The cost worked out to about Rs.20 per acre and I thought I was doing the places well. The Estates looked well and year after year I looked for the bumper that never came! If I got anything like a decent crop (4-5 cwts. per acre) the following year it dropped to 2 cwts. In parts of the Estate the trees had a 'Cabbagy' look. Failure began to pall on me and the arrival of our Scientific Officer made me say to myself, "why not begin all over again, get my soils analysed thoroughly well and seek Mr. Anstead's advice?" This I did, sending 4 samples to Mr. Alfred Gordon Salamon, Fenchurch Avenue E. C., who did the analyses very thoroughly and charged £5-5-0 per sample. I sent these analyses to Mr. Anstead and asked his advice. He took every trouble in working out a 3 years' scheme for me, or rather 2 years, and after seeing the results last November, he was able to advise for another year. I accepted his advice without question. Before giving the scheme he asked a number of questions *re*. Rainfall, Elevation, Aspect &c., and what I was prepared to spend per acre. To the latter I replied Rs.25 plus cartage. This worked out eventually to about Rs.32 per acre, or an increase of Rs. 12 to what I had been spending. My crop went up on the 50 acres from 9 the previous year to 10 tons, and from 10 to 18; on the 100 acres from 9 the previous year to 38, followed by 21. I therefore, on the 150 acres spent 1,800 Rs. more on manures (which was equal to about 1½ tons of crop) and for this increase my crop doubled itself. This year I am expecting (with anything like good rain, which has not come yet, April 7th!) 18—20 tons on the 50 acres, and 30—35 on the 100 acres. If this comes off, and I see no reason why it should not with good rain, I shall average 15 tons for 3 years off the 50 acres, and 30 tons off the 100, against 5 tons for 8 years and 14½ tons. The whole aspect of the estates has changed and parts which were "Cabbagy" are now vigorous, with a good spread and long spiky close knotted wood. Parts which have just given 8—10 cwts. an acre are scarcely feeling it and will give 6—7, while other parts which have just given 6—7 are doing the same again. A neighbouring Estate carrying out a scheme on the same lines is having good results also, after a succession of heart-burning failures. Readers will say "Yes. you just happened to hit good seasons, wait and see!" I am open to wait and see, and meanwhile instead of a deficit every other year which is far too common on most estates, I can show handsome profits for 2 consecutive years, and see no reason why I should get a deficit again, provided I carry on manuring and cultivation in the sound way recommended by our Scientific Officer, whose excellent article on manuring, and when, in the *Planters' Chronicle* for January 25th most of us must have read. In addition to my crops increasing, the quality of the bean has vastly improved also. Last year one lot topped the market and the rest also sold well. Previously the coffee from these estates used to be in the same boat as many others and realized very ordinary prices. The report, since I started manuring on the lines laid down by Mr. Anstead, is invariably good, and the liquor, "exceptionally good."

Section.	Manures applied.	Date of application.	Amount applied per acre.	Crop picked.
	General Fertiliser ...	March 1910	2½ cwts	
	1 Poonac ; 2 Bone ; 10½% Sulphate of Potash...	Octr. 1910	2½ cwts	1910-11. 2 tons
I.	Basic Superphosphate ...	March 1911	6 cwts	
	Nitrate of Soda ...	Novr. 1911	1 cwt	1911-12. 1½ tons
5 acres.	Complete Fertiliser ...	March 1912	5 cwts	
	Sulphate of Potash ...	Novr. 1912	1 cwt	1912-13. 3 tons
	Slaked Lime ...	March 1913	2 tons	
	(Fish ...	Novr. 1913	3-4 cwts	1913-14. estimated 2½ tons.)
	General Fertiliser ...	March 1910	2½ cwts	
		Octr 1910	2½ cwts	1910-11. 2½ tons
II.	Fish ...	March 1911	5 cwts	
	Saltpetre ...	Novr. 1911	1 cwt	1911-12. 2 tons
10 acres.	Complete Fertiliser ...	March 1912	5 cwts	1912-13. 4½ tons
	Fish ...	March 1913	5 cwts	
	(3 Basic Slag : 1 Sulphate Potash...	Novr. 1913	4 cwts	1913-14. estimated 3 tons.)
	Complete Fertiliser ...	March 1910	2½ cwts	
		Novr. 1910	2½ cwts	1910-11. 1½ tons
	Fish ...	March 1911	5 cwts	
III.	3 Basic Slag ; 1 Sulphate Potash ...	Novr. 1911	5 cwts	1911-12. 1 ton
10 acres.	Complete Fertiliser ...	March 1912	5 cwts	
	3 Fish ; 1 Sulphate Potash.	Novr. 1912	4 cwts	1912-13. 2½ tons
	Nitrolim ...	March 1913	2 cwts	
	(3 Basic Slag ; 1 Sulphate Potash ...	Novr. 1913	3 cwts	1213-14. estimated 4 tons.)
	General Fertiliser ...	March 1910	2½ cwts	
		Novr. 1910	2½ cwts	1910-11. 2 tons
	Basic Superphosphate ...	March 1911	6 cwts	
IV.	Saltpetre ...	Novr. 1911	1 cwt	1911-12. 3½ tons
	Complete Fertiliser ...	March 1912	5 cwts	
10 acres.	Sulphate of Potash ...	Novr. 1912	1 cwt	1912-13. 4 tons
	Slaked Lime ...	March 1913	2 cwts	
	(Fish ...	Novr. 1913	4 cwts	1913-14. estimated 4 tons.)
V. 15 acres.	Same as IV.	...	...	1910-11. 1 ton 1911-12. 1½ tons 1912-13. 4 tons (1913-14. estimated 4 tons.)

P. M. WILKINS.

DISTRICT PLANTERS' ASSOCIATIONS.

Nilgiri Planters' Association.

At the Annual General Meeting of the Nilgiri Planters' Association held at the Armoury, Ootacamund, on Friday the 28th March, 1913.

PRESENT:—Messrs. L. L. Porter (Chairman,) J. S. Nicolls (Honorary Secretary,) W. Rhodes James, J. G. Vernede, A. K. W. Downing, P. L. D. Beaver, R. N. C. Groves. J. H. Pascoe. Robert Stanes, C. Gray, L. A. G. Rogers. Stanes, C. H. Brock, J. Hedde, G. Oakes, C. W. Deane, W. A. Cherry. E. S. Clarke. Kinlock, F. M. Cockburn, and W. P. Scott. *Visitor.*—Mr. Alister West, *by Proxy*—Mr. B. Von Dulong.

The Chairman before opening the proceedings feelingly referred to the sudden death of Mr. A. W. Wingrave.

61. Proceedings of last meeting confirmed.

62. *Act* 1 *of* 1903.—Read High Court ruling in Case No. 62 of 1911 on the file of the Gudalur 2nd Class Magistrate's Court—Mr. J. S. Nicolls *vs.* Pongay Maistry. The Association were of opinion that a further appeal should be made. Proposed by Mr. E. S. Clarke and seconded by Mr. W. Rhodes James:—

"That this Association offer Mr. Nicolls their support."—Carried unanimously.

63. *Non-Service of Warrants.*—Read letter from the Deputy Inspector-General of Police. Southern Range. dated 13th February, 1913.—Recorded.

Read Circular letter from the Taluq Magistrate, Gudalur. dated 1st February, 1913.—

64. *Publication of G. Os. in the Nilgiri Gazette.*—In reference to No. 47 of meeting held on 14th November, 1912, read Honorary Secretary's letter to the District Magistrate, Nilgiris, dated December 7th, 1912, and the District Magistrate's reply No. 378 of 1912. The Honorary Secretary was instructed to write and ask that all matters affecting Planters should be published in the *Nilgiri Gazette* and not only those with reference to the Labour Act 1 of 1903.

65. *Roads and Communications.*—"The Droog Road"—Necessary steps were being taken for repairs.

Kil-Kotagiri Road.—The following resolution was proposed by Mr. C. H. Brock and seconded by Mr. Deane and carried:—

> "That this Association request the District Board to ask Government
> "for a special grant to convert the present bridle path to
> "Kil-Kotagiri into a cart road by widening of the present road
> "and by altering the trace where necessary from the Kodanaad
> "road to the Government building at Solur Muttom."

66. *District Board Membership.*—In reference to No. 51 of meeting held on 14th November, 1912, read Honorary Secretary's letter to the President, Nilgiri District Board, dated 7th December, 1912 and the President's reply dated 17th December, 1912, enclosing copy of Proceedings of the District Board meeting held on 18th April, 1911.—Recorded.

67. *Railway Freight.*—In reference to No. 53 of meeting held on 14th November, 1912, read Honorary Secretary's letter to the Secretary, U. P. A.

S. I., dated 7th December, 1912, and his reply dated 9th December and Circular No. 42 of 1912 giving cover to correspondence on the subject. The Honorary Secretary was instructed to place the matter on the Agenda of the next U. P. A. S. I. meeting.

68. *Scientific Department.*—Read U. P. A. S. I. Circular No. 2/13. Proposed by Mr. W. Rhodes James and seconded by Mr. J. H. Pascoe.

> "That this Association is in favour of the renewal of the appointment "of the Sc. Officer for another 5 years after 1914."—Carried.

69. *The Late Mr. Edmiston.*—In reference to No. 59 of meeting held on 14th November 1912, read Mrs. Edmiston's letter to the Honorary Secretary, dated 23rd December 1912, thanking the Association for their kind sympathy.

70. *School of Tropical Medicines.*—Read Messrs. Harrison and Crossfield's letter of 17th December 1912, enclosing copies of an appeal for £ 100,000 for the extension and development of the London School of Tropical Medicines. Contributions sent to Messrs. Harrison and Crossfield, Ltd., Quilon, will be forwarded to their London House.

71. *Tea Cess.*—Read Circular No. 170 T. C., dated 27th January 1913, from the Asst. Secretary Indian Tea Cess Committee notifying that the Cess would be continued for a further period of 5 years.—Recorded.

72. *Customs Duty on Coffee, Tea and Rubber Machinery.*—Read U. P. A. S. I. Circular No. 39/12. dated 20th November 1912. The meeting was of opinion that the necessary machinery should be imported free of Customs duty. The Honorary Secretary was instructed to write to the Secretary, U. P. A. S. I. to that effect.

The Honorary Secretary then read the following Annual Report and presented accounts:—

"Mr. Chairman and Gentlemen,—I have the honour to submit to you my Annual Report and Accounts for the year ending 31st December 1912. There have been four General meetings held, viz., on the 16th April, 30th May, 18th July and 14th November at which there were respectively 19, 21, 16 and 15 members present. At the meeting held on the 16th April we had pleasure of seeing the Chairman of the U. P. A. S. I. amongst us.

New Rules.—These were passed at our May meeting and have been circulated to all members. Subscription to the Association is now assessed on an acreage basis. This has unfortunately brought in the resignation of one of our oldest members, viz., the Ouchterlony Valley representing 4,362 acres. We were only receiving on account of this large acreage Rs. 30 as subscription to the funds of the Association and Rs.100 as subscription towards the S. O. Fund. Subscriptions towards the S. O. Fund have been paid to the U. P. A. S. I. as a separate subscription to what we have been paying on our acreage basis. Our subscription to the U. P. A. S. I. on 4,362 acres represents Rs.181-12. We have agreed now to pay towards the general fund of the parent association on an acreage basis of 2 annas per acre, the remaining 6 pies of your assessment being available for the expenses of our own Association.

I sent all members reply post cards requesting them to favour me with acreage particulars of their estate and with what products such acreages were planted. A great number have complied with my request, but some have put my post card along with unused half in that ever ready "W.P.B."

It is to be regretted. It has not only delayed the sending out of bills to members for subscription due, and in their instances perhaps has prevented my making accurate assessments. but it has also prevented my placing before you a correct account of the total number of acres planted with coffee, tea, rubber and other produce.

Subscription to the S. O. *Fund.*—I think this was originally promised by members for 5 years. This terminates in 1914. Those who have resigned their membership of our Association should be requested to fulfil this promise.

Labour.—We have during the year discussed a Registration Scheme and you will have seen from the annual report of the W. P. Association that there is little likelihood of its being put into force even in an amended form. The discussion on the scheme has, as far as I am aware, not started "even brain waves." Personally I think considerable improvement can be gained by planters working more together. If a planter has a rogue of a maistry now, he has one aim and that is to plant the rotter on some one else and recover his advance and when he has succeeded he pats himself on his back and thinks himself smart. It would have been more to the interests of the whole community of which he is one if he branded the rogue and suffered his loss. I think something might be gained if Honorary Secretaries of Associations kept a register of maistries employed by all members of their Associations. In this way if a maistry came to a member for advance he might probably by referring to the Honorary Secretary of his Association find something about the man's past history, or if the maistry came from some other district, a reference to the Honorary Secretary of the Association of that district might bring the required information. I should like to see it go further and that planters agreed to advance no new maistry without first making a reference to his own Honorary Secretary. I am certain the maistry of to-day is not the same kind of man he was when I first started planting in Ceylon 26 years ago. He has deteriorated, and I shall not attempt to try and find reasons for this. From what one reads in papers I have only 4 years more before I ought to be put on the shelf to make room for some more up-to-date youth. I shall read you to-day a letter written by a late assistant tea maker of mine who came from Ceylon and returned back there addressed to a cooly of my estate. He informs the cooly that his superior has asked him to procure 20 or 30 Canarese coolies. Is this an up-to-date method of recruiting labour? I would then warn you all against engaging "Ceylon Tea-makers or Conductors."

S. I. R. Freight. —I regret to say that no progress has been made. A plan showing places where receiving and forwarding stations should be placed was prepared by Mr. Porter, but there the matter has stopped.

Experimental Plot.—The Committee you appointed to watch your interests have taken considerable trouble in considering the various points and in recording their opinion on them. The thanks of the Association are due to them. The work has been started and I sincerely hope the experiments that are being carried out will prove beneficial to those interested in the Coffee Industry.

S. *I. P. B. Fund.*—I would refer you to what I said in my Annual Report last year. I place a list on the table and ask all present to put their names down.

The Accounts.—The accounts are on the table and have been duly audited by a member of the Association. There is one entry needing explanation to you and that is the amount I have put down to be written off. I brought it to your notice last year. I have done all I can to recover these outstandings against certain members. They treat my letters and reminders with supreme contempt; they do not even object to receiving registered letters. It would be so much easier if they would write denying their liability or regretting their inability to pay. I see no use of going on increasing their debt to the Association by adding on to it yearly subscriptions. I am afraid next year it will be necessary to write off a further amount of Rs.155.

3 Members representing 40 acres resigned during the year.

3 Members representing 360 acres joined.

On 31st December, 1912, the total number of members was 59 representing 16,179 acres on which acreage we paid our subscription to the U. P. A. S. I.

Since 1st January, 1913, the following members have resigned:—

Mr. Wapshare representing	...	4.362 acres.
Mr. Martyn ,,	...	300 acres.

Mr. Martyn resigned as he has sold his estate, so I hope this acreage will not be lost for ever.

On 1st January, 1913. the total acreage represented by members is 12,760 acres of which 5,209 acres is planted with Tea, 4,620 with Coffee, 522 with Rubber and 2,409 acres is chiefly represented by the members who have thrown away my post cards.

The total assessment on this acreage is		... Rs. 1,993 12 0
Our total subscriptions to U. P. A. S. I. for 1913-14 will be		... Rs. 1,595 0 0
as against		
1912-13 U. P. A. S. I., subscriptions	...Rs. 696 10 0	
1912-13 S. O. Fund ...	...Rs. 1,250 0 0	
		Rs. 1,946 10 0
There will be after paying the U. P. A. S.		... Rs, 398 12 0

Provided all members pay up—left for working your own Association.

Thanking you for the support you have given me I now place my resignation and that of the Committee in your hands.

Proposed by Mr. W. Rhodes James and seconded by Mr. C. H. Brock.

> "That the accounts be passed and the Report adopted, a vote of thanks be passed to the Honorary Secretary."—Carried.

73. Election of Office-bearers for 1913.—

Chairman	...	The Hon'ble Mr. E. F. Barber.
Vice Chairman	...	Mr. L. L. Porter.
Hony Secretary	...	Mr. J. S. Nicols.

Votes of thanks to the Chair and the O. C. Nilgiri Volunteers for the use of the room terminated the proceedings."

(Signed) L. L. PORTER,
Chairman.

(Signed) J. S. NICOLLS,
Honorary Secretary.

Papers on Table.—Department of Agriculture Madras, Leaflet No. IV of 1912.

Do do do Bullet: No. 65 Vol. III.

The Agricultural Journal of India, Vols. VII and VIII.

Memoirs of the Department of Agriculture in India, Vols. I and III.

Do do do Vols I to V.

The Agricultural Ledger No. V.

Report of the Agricultural Institute. Pusa, 1911-12.

Agricultural Research Institute, Pusa, Bullet: Nos. 31 and 52.

Report on the Operations of the Dept. of Agriculture in Madras for 1911-12.

59th Annual Report of the Ceylon Planters' Association.

VARIABILITY IN THE QUALITY OF SEEDS AND CUTTINGS.

The relatively large number of crops that are propagated by the use of cuttings and by other vegetative means, is a characteristic feature of tropical agriculture. Another not able feature is the relatively large size of the seeds of those plants which are reproduced sexually, as well as the fact that generally this seed is sown in nursery beds previous to planting out the seedlings in the field or orchard. There are one or two expeptions, for instance, cotton, maize and sometimes rice are sown in the field direct: but, in a general way, it may be stated that the reproduction and establishment of economic plants, together with methods of 'seed' supply receive greater personal supervision in the tropics than do these matters in other parts of the world.

It is pointed out in the article referred to, that seeds a better term under tropical conditions would be 'planting material'—are by far the most variable things the agriculturist has to purchase or produce: weight for weight they are the most costly. and finally the entire success or failure of a crop (and even of succeeding crops) may be wholly determined by the kind or condition of the material planted.

Variability in quality shows itself mainly in the degree of purity and germination capacity. For reasons already indicated, degree of purity cannot vary to a large extent in tropical planting material unless the intermixture of different strains, or infection with disease, be included under this heading. On the other hand, germination capacity varied very much, the chief causes being maturity of 'seed' at time of collection, climatic conditions and exposure during the flowering period, age of 'seed' and lastly, mechanical injury caused by careless handling, or by insect pests in the field or during storage,

Age is perhaps the most important cause, in the tropics of variation in germination capacity. Planting material in the tropics is typically succulent: the long-distanced and necessarily slow distribution under warm conditions reduces germination capacity mainly through the loss of moisture, and unless special packing is resorted to, and unless the matters attendant on this distribution be dealt with promptly and with care, there must always be variability in the germination capacity of the transported material.—*The Agricultural News.*

CORRESPONDENCE.

The Editor,
The "Planters' Chronicle."

Dear Sir,—I have been meaning to write to you for some time but I have been so busy I have not been able to manage it, or to send you notes of some experiments with explosives which are as follows:—

My experiments were carried out with gelignite in 6 year old tea which has been going out in patches on account of a hard laterite sub-soil coming within about 9—12 inches of surface soil and apparently of considerable depth.

The first charges I used at 2½ feet, these I found too shallow, I then put holes in at 2 feet 9 inches with better results; again more at 3 feet and 3 feet 3 inches these I found perfect. I put charges at 12 square apart and fired in groups of 4 at a time, standing between the shots while they exploded; the whole ground was thoroughly shaken below, hardly any surface movement being noticeable, but on digging on the shots and between them, I found the sub-soil to be thoroughly cracked or broken. I had the holes made with an old crowbar about 4 feet 6 inches long in which I put a cross-piece about 1 feet long chisel point on bar and I found a hole can be made 3 feet—3 feet 3 inches is about 2 minutes, driving the bar in with a 5 or 7 lb hammer.

I have written Nobel's Agents regarding cheap fuse and the lighter cap *No. 3* instead of No. 6, this is quite suitable for dynamite, but not heavy enough for gelignite, but, I see no reason why dynamite shouldn't be used this being slightly cheaper. I work out the cost of a shot with *this*.

A *No. 3* cap and *3 feet* of common fuse (all right unless the ground is wet) at 3 annas per shot plus freight with 200 shots per acre *Rs.—56*.

I shall continue using this method, more particularly on patches where tea is lookink stunted and sick, making it probable that its feet are on hard subsoil and will let you know the results from time to time.

Yours faithfully,
(Signed) Colin Hindley.

Spraying Tea Bushes.

A good insecticide, costing but little and easily obtainable, is what H. Maxwell Lefroy, Esq., the Imperial Entomologist, has been trying to render available to planters in India for several years and the new insecticide Vermisapon has been very highly recommended by him. The manufacturers consulted Mr. Lefroy and he suggested certain modifications of formula, the result has been highly satisfactory. He has tested Vermisapon on a variety of insects and says that it is a thoroughly reliable contact poison for use against all sucking insects such as bug, mealy bug, scale insects, plant lice, thrips, etc., also against small caterpillars and other biting insects. It is made in Calcutta by Smith, Stanistreet and Company, and is therefore easily obtainable and taking this into account with the fact that its price is remarkably low, and considering what Mr. Lefory has said about it, we think that Vermisapon will prove to be extremely useful to planters in India. The manufacturers have also a spraying machine, called "The Auto-Spray", which is exceptionally suitable for use on tea gardens, etc., as it is practically automatic, is economical and cheap.—*The Indian Planters' Gazette and Sporting News.*

SELECTED CUTTINGS.

Artificial Fertilisers in Russia.

The official "Vyestnik Finansov" (St. Petersburg) of 2nd March publishes an article drawing attention to the growing practice of intensive cultivation in Russia and the consequently increasing use of fertilisers. The average yearly consumption of artificial manure in Russia during the past 10 years works out at 13,000,000 pounds; 6,400,000 pounds of which consisted of superphosphates, and 4,500,000 pounds of basic slag. There has been a remarkable increase during the last few years, as is shown by the total imports of mineral fertilisers, which rose from nearly 9.000,000 pounds in 1908 to more than 24,000.000 pounds in 1911. Superphosphates and basic slag account for about two-thirds of these amounts. Russia is as yet unable to produce anything like the quantity of artificial manure required for agricultural purposes in the country, the total home production of superphosphates having only risen from 4,104,603 pounds in 1907 to 5,338,137 in 1909.

1,000 pounds = 16 tons (about)

—*The Board of Trade Journal.*

Coffee.

The reduction in the world's visible supply is exactly the same as it was during March last year, although the Brazilian receipts have been 150,000 bags less, so that the deliveries must have been correspondingly smaller. The terminal market at one time was 1s. dearer, but want of support led to a reaction, and at the close rates are about 3*d.* cheaper. More confidence, however, has been shown as the decline has probably been quite sufficient, taking into consideration the actual stocks and the smallness of this year's crop of mild descriptions. The latter which have been offered recently in large quantities will shortly be finished, and then more attention will have to be given to Santos. The ramoured issue of a new loan by the State of San Paulo to take up the remainder of the valorisation coffee is not generally accepted as likely to take place, but reliable information is difficult to obtain. The auctions have been heavy, and with a strong demand for all grades of Costa Rica prices have steadily advanced: medium and common sorts are fully 2*s.* to 2*s.* 6*d.* dearer, while the finer grades are from 1*s.* to 1*s.* 6*d.* per cwt. higher. As more than half the crop has been received, rates may possibly advance still further.

LONDON COFFEE RETURNS.

	Home Consumption.		Export.		Stock.	
	1913	1912.	1913	1912.	1913	1912.
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
For week ended March 29 ...	207	265	336	387	13,966	13,728
For 13 weeks ended March 29 ...	2,568	1,230	3,591	5,201	...	...

—*The Produce Market Review.*

The Planters' Chronicle.

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(INCORPORATED.)

Contents.

The Scientific Department issues an article on "A Borer in Hevea Rubber" giving an example of its Depredation, Life History and Control. Though Mr. Green says "there is nothing to be alarmed about" still it would be advisable to keep a constant watch against its increase. Consistent hunting for it will save much trouble especially if labour should be scarce. The possibility of an increase, and the impossibility of coping with it at certain times, should be constantly kept in view.

It is to be noted by those interested in Sisal culture that the first crops are almost always poorer in quality than later ones. Also a succint account of the Bougainvillea is given which extends our knowledge of this beautiful plant.

A very interesting paper by Mr. Harold Hamel Smith on "Farming by Dynamite" is reproduced, showing how extensively explosives are being used all the world over in agriculture, and promising a much larger future. That when the difficulties that hedge around its general use in India are removed, its use will become widespread in opening land, we are convinced. But it is on land *growing* tea, coffee and rubber we wish to see experiments made, and in connection with this we would call attention to Mr. Hindley's letter published in our last issue (May 3rd). The result of those experiments will be awaited with general interest. Mr. Hindley has very kindly promised to keep the Editor informed. We have no doubt of the result.

The Proceedings of two District Planters' Associations are published, those of the Shevaroy Planters' Association and South Travancore Planters' Association. We trust that the Circulars to be drawn up by the former and distributed amongst the maistries and headmen of villages in the Salem District will have the desired effect, and countermine the pictorial attractions as depicted by their late visitant from Burmah.

THE SCIENTIFIC DEPARTMENT, U.P.A.S.I.

A Borer in Hevea Rubber.—A specimen of a big boring larva found in the root of a dying Hevea tree has recently been received with the following description of the damage done. "A tree looking quite fresh and healthy, suddenly fell down and on examiation it was found that all the side roots and tap root had been eaten up. There was only about six inches of tap root left in which the grub was found and for about six inches above ground the stem and bark were dry. Above that the bark was fresh, and so was the foliage, but when the bark was cut there was no flow of latex. From the appearance of the tree it looked quite healthy." The specimen was sent to the Government Entomologist, at Coimbatore for identification and he reports as follows:—"The larva is undoubtedly the grub of a *Cerambycid* (*longicorn*) Beetle, although it is impossible to say what the precise species is. These grubs bore as a rule in living wood and are quite capable of doing damage even up to the killing of the tree in which they bore. Possibly your larva may be *Batocera rubra*, but all these *Cerambycid* grubs have a strong family likeness and it is as yet impossible to distinguish between the different species in the larval stage. Assuming that your species is *Batocera rubra* the following is an account of it. *Distribution.* Throughout, Southern India. seems to emerge at beginning of rains in May and October.

"*Life history.*—Eggs are laid in or under bark and the grubs tunnel into the stems or roots of the tree attacked. The larval stage probably lasts over a long time, possibly several years. When full fed it pupates in its tunnel, the pupal stage lasting about one month,

"*Food plants.* - Occurs commonly on Mango. Also attacks Duki Fig, Silk Cotton, (*Bombax Malabaricum*) and Hevea Rubber.

"*Control.*—Injection of a mixture of two parts chloroform to one part creosote into larval tunnels where accessible.

"Collection of adult beetle by hand. The beetles are often attracted by light at night. Even if your species is not *B. rubra* the general life history and control methods will be roughly the same. The large long antenna'd beetles should be looked for at the beginning of the rains and collected as far as possible. Any soft wood trees in or around the estate should be searched daily for them."

This beetle has been reported as a pest of Hevea in Ceylon (See *P. C.*, VIII, p. 94), and in Trinidad it also attacks Cacao and Rubber. In the latter island it was recommended to remove all useless trees which serve as breeding and feeding places from the vicinity of estates. "Traps could also be employed for the capture of the insect. Such traps consist of lengths of the woods of the trees frequented by the insects while feeding or breeding. These are either suspended from the branches of the cultivated trees or placed endwise on the ground leaning against the trunks. Mature insects coming to the traps can be collected and destroyed, eggs deposited may be scraped off, and if any eggs should hatch the larvæ would tunnel into the trap from whence they could be extracted, or the trap might be burned thus destroying the larvæ it contains. The trunks and branches of cultivated trees among which the traps are placed should be well sprayed with an insecticide to protect them against attack and force the insects to resort to the traps for feeding and breeding. Lead Arsenate spray, 2 to 3 lbs. to 100 gallons of water, would probably be the best for this purpose.

The powder is first mixed with a sufficient quantity of water to make a thin smooth paste, all lumps being carefully pulverized, water is then added to make 100 gallons. White washing of the trunks and main branches may also afford some degree of protection."

This insect has also attracted attention in Ceylon and in *Bulletin No. 3 of the Ceylon Department of Agriculture* Mr. Green, the late Entomologist, deals with it at length, and I quote the following from this Bulletion.

" There is nothing to be alarmed about, but in consideration of the fact that a single grub may be responsible for the death of a well-grown rubber tree, and that one of the beetles may infect many trees, it will be prudent to give the matter some attention before it becomes really serious. It is indigenous in Ceylon, but has only recently had the opportunity of testing the edible qualities of the Hevea tree. With the great extension of rubber cultivation, it is only to be expected that various insects will accustom themselves to the new source of food. The injury may take two forms, either central or peripheral. In the former case the centre of the tap root is hollowed out. The tunnel may extend well up into the base of the stem, increasing in diameter as the grub grows larger. In the second case the attack is from the outside, usually at, or just below. ground level. Occasionally the point of entry may occur higher up on the stem. Irregular cavities are eaten through the bark and into the wood of the tree. The symptoms are usually obscure. There may be a gradual loss of foliage, but this is not readily distinguishable from the natural periodic defoliation. When the injury is below ground level the first intimation may be the collapse of the tree, which frequently breaks off at a point a few inches below the collar. Or, in sheltered situations, the tree may gradually die and dry up. The method of entry in cases of external attack is a comparatively simple matter. The eggs are deposited in deep cavities of the bark and in wounds especially such as have been induced by canker. The adult beetle is a large and conspicuous insect when seen by itself but its scheme of colouration harmonizes perfectly with the bark of the trees upon which it habitually rests. It is of a dull olive brown colour, with a few reddish spots on the back of the thorax and wing covers. The wing covers are thickly specked on their basal half with minute prominent black spots, and there is a small but conspicuous and sharply defined white-shield-shaped patch at their junction. There is a broad white band on each side extending the full length of the body. The antennæ and legs are darker brown. The antennæ are long and stout extending far beyond the extremity of the body. The thorax is armed on each side with a sharp, stout, thorn-like process and there is a smaller but similar process on the shoulder of each wing cover.

"The destruction of each individual beetle of this species may possibly save the lives of a dozen rubber trees. It is unlikely that they occur in any considerable numbers, and it would be useless to employ coolies solely to collect the insects. But it would pay to offer a small reward for each beetle of this kind that may be brought in by the tappers or scrap collectors. If the eggs are deposited in wounds and in cankered patches of bark it will be important to safeguard these possible points of entry by cutting out all diseased patches and tarring the exposed surfaces. The same treatment should be applied to accidental wounds. Tapping wounds, especially those made by the paring system, are so constantly disturbed that there is little chance of the pest being able to establish itself in those spots. And wounds caused by pricking are automatically sealed by coagulated latex."

The beetle is quite common in the plains of India and several specimens have been sent into this office from time to time. A watch should be kept for it on rubber estates and should it ever become troublesome the above information will prove useful.

Sisal.—The following information is extracted from *The Rubber World* of 17th April and may be of value to those who are experimenting with this product in Southern India.

"It is pointed out by Mr. L. H. Dewey, from experience gained in Hawaii, that the first harvest of leaves from the maguey and sisal plants is always of a much poorer quality than subsequent harvests. This is due to the fact that the first and oldest leaves are always considerably shorter and often more damaged than the later ones, besides being often partly dried up. For these reasons the first crop of fibre is both too short and improperly cleaned, and by no means represents the quality of the subsequent crops. Besides, such crops almost invariably leave in the minds of buyers a bad impression which may take several crops to overcome. In order to avoid such occurrences the Philippine agricultural authorities suggest that the producers of these fibres, especially those who use or intend to use machinery for cleaning the fibre, should be careful in so marking their first crop as to show that it is not a representative sample of subsequent crops, thereby avoiding future sacrifices on their part."

Bougainvillea.—I have often been asked for the history of this plant which is such a well known feature of Indian Bungalow compounds both in town and district, and I am indebted to the *Gardeners' Chronicle* for the following information about this beautiful shrub, the botanical name of which is *Bougainvillea Sanderiana.*

"The famous French navigator, LOUIS ANTOINE DE BOUGAINVILLE (1729-1811), has a splendid monument to his everlasting memory in the Brazilian shrub which his botanical friend and fellow-countryman, Commerson, discovered and named after him. In all tropical and sub-tropical countries where flowers are cultivated, Bougainvillea has become an established favourite. Its glories are sung by travellers, and even globe-trotters are roused to enthusiasm when they first see it in some sunny clime. Madeira is now almost as famous for its Bougainvillea as for its wine and bananas, and the plant is said to be equally popular at other ports of call in the warmer parts of the world. Like many other plants, Bougainvillea thrives particularly well near the sea. It is most probable that the several varieties or species known in English gardens are sports which originated in tropical gardens. The famous brick-red *B. lateritia*, the best form of which is called Rossa Catelina, probably originated in Madeira, where there is a very old plant with an immense stem hanging over an ancient garden-well at Quinta Sant Andrea, which "for many years has borne its burden of blossoms and called forth the admiration of untold numbers of tourists through successive winters." This refers to *B. lateritia, Rosa Catelina* having been obtained, we are told, from Las Palmas Grand Canary, by Colonel PETRE, Westwick House, Norwich. This gentleman showed a large flowering branch of it at a meeting of the R. H. S. in April 1909, when it was awarded a first-class certificate. These two, with B. Sanderiana, Maud Chettleburgh, and B. Cypheri, are no doubt sports from B. glabra, which differs from the other recognised species, and *B. spectabilis*, both in having almost glabrous, comparatively small leaves, and in its time of flowering. The variety Cinnabar, a red-flowered sport from *B. spectabilis*, said to have originated in Palermo, has lately been named *B. Lindleyana.*"

R. D. A.

FARMING BY DYNAMITE.

By Harold Hamel Smith, Editor of the "Tropical Life."

A paper read at the Third International Rubber Conference held in New York, 1912.

While I have long suspected the possibilities of explosives in connection with agriculture, especially in the tropics, it has been only during the last twelve months that I have been able to satisfactorily demonstrate how very useful dynamite, and the other "ites" can prove, when used with discretion and by trained natives or Europeans. By their use both time and money can be saved, and better work done, both as regards the soil and the crops.

As regards the handling of these high explosives by natives, I would consider that any race or tribe which is intelligent enough to be trained to tap rubber trees, or extract pulque from the maguey plant as is done under the direction of white supervisors. could be trained to handle these explosives drill the holes, and pack in the cartridges under the same class of white directors as with the rubber tapping.

I did intend to devote my paper to "Rubber Seed oil," a subject to which I have given a considerable amount of attention of late, but have chosen the question of "Farming by Dynamite" instead, as it is more widespread and international in character, and is of special interest to an Anglo-American Tropical Congress. On account of the now widespread use of explosives on cultivations, I would first state that if I do not include the names of the leading centres which have latterly been using or experimenting with them for breaking up soils (some of the farmers in the Western States of America have, I understand, regularly blasted their ground for twenty or thirty years past, and obtained bumper crops thereby), nor mention the names of all the leading journals that have been good enough to open their columns to discuss the matter, it is not for want of appreciation on my part of the important share that they have taken in helping us to become "At Home" with the use and handling of explosives, but for lack of space and time at my disposal and yours. I must, on the contrary, be far more brief than pleases me, for this is a subject which, the more it is discussed, the more one can realize what can be done with dynamite, and hence the more one would like to say on its use.

Dynamite or other explosives—and for the sake of brevity let me say "right here," that every time I use the word dynamite I mean to infer "or other explosive if more suitable"—can be used with advantage in agricultural industries for the following reasons:—

1. To break up hard or virgin soil to facilitate ploughing; and especially to break up the under-crust, when present, which no plough could penetrate, at any rate no plough used by the average farmer or planter.

2. To blast out for removal, boulders, or rocks, and especially tree stumps, whereby not only is the risk of root disease removed, to be easily and properly ploughed; which otherwise would be impossibls in a satisfactory manner, if the stumps or rocks are left *in situ*.

3. For clearing the soil of pests, destroying ants' nests, or rabbit warrens. etc., etc., as well as for regenerating and aerating hard or worn-out soils generally—as the sugar-lands on some of the West Indian estates which are not ploughed, but only hoed, *i. e.*, the surface only scratched over, but the hard pan sub-soil is left year after year, and so becomes waterlogged and airless; hence dangerous.

4. For throwing up the soil for drains, especially deep gullies, and facilitating its removal by ploughs or hand.

5. For making holes for tree planting, and at the same time loosening the soil, which is a great advantage; also for fence-post holes, or for setting uprights for buildings, etc., in position.

6. For well-boring, or well-torpedoing—*i. e.* for increasing the flow from an artesian well by exploding a charge at the bottom of a well, to widen the aperture, and break up the ground, to let further supplies of water (or oil, if an oil-well) come through.

As time goes on, many other uses on the estates will, no doubt, be found, but as I do not pretend to have an exhaustive knowlege on the subject, I think I have said enough. Of course, I do not pretend to touch on the use of explosives for mining, since I speak only from the agriculturist's point of view: not even of their utility for removing large masses of rock or soil for making estate roads, as the latter, although not uncommon, is too big and dangerous a task for the average planter, and should not be carried out without consulting an expert, one of whom now-a-days is to be found at all large centres, especially in the neighbourhood of mines.

"It must not be thought that dynamite obviates the necessity of top ploughing," very truly points out the *Queensland Agricultural Journal.* "Far from it. The plough must be used just as much as ever. The only difference is, that the dynamite expends its disintegrating force in the sub-soil, which is never touched by the plough, so that one is not merely planting the crops in the same soil year after year," but can, by its use, enable the crops to draw up their nutriment from below. Where clay sub-soils form a water seal, the use of explosives, if correctly applied, breaks up the clay strata and so allows the accumulated and stagnant water to pass through (at the same time the explosion kills myriads of harmful lives), and dissolving the plant foods in the lower, and hitherto inaccessible strata, liberates it in such form that it can be drawn up by capillary attraction, and pass through with the now non-stagnant water to be assimilated by the crops. May I remind you here—as I reminded the readers of my book on "Cocoanuts"—of the need of regular, adequate supplies of water at all times, if you want good crops. Water is necessary, and therefore should constantly be at the disposal of the crops (provided, of course, if not in over supply), to convey the plant's food in soluble form up to the crown. The quantity of such food assimilated or digested by the plant is roughly proportional to the amount of water which it absorbs—provided, of course, that the food is there to be absorbed; but the food alone is no use; without the water it cannot pass up the trees or plants and nourish them.

"Farming by dynamite," wrote the (London) "World's Work" last April, has gripped the United States and is spreading through Canada and Mexico like a prairie fire. "The farmers who have tried it, swear by it, and are upheld by the leading authorities in agricultural science." I can confirm this from the tropics. Since I first drew attention to the use of high explosives in tropical and sub-tropical agriculture by reviewing a book (The book of "High Explosives,' published by the Nobel Explosives Co., Ltd., Glasgow), I have received innumerable applications for copies of the book and further information on the subject, right up to the time of writing these notes, which I stopped doing to order a copy to be sent to a cacao planter in Una, State of Bahia, Brazil. The "Queensland Agricultural Journal," already quoted, evidently found the same thing, for the editor writes:—"Since the publication of our articles on the value of dynamite as an aid in clearing land, and to subsequent agricultural operations, judging by the numerous letters we have received from farmers and fruit growers seeking further information on the subject, much interest—we might almost say enthusiasm—has been aroused in many parts of the state in connection with the use of dynamite on the land;" while the "Times of Ceylon" quotes the following instance of its use for rubber "planting by a Kelani Valley (Ceylon) rubber planter, using only ordinary dynamite cartridges: " First of all he used a quarter of a cartridge, then a half, and then a full one and kept data of the area of ground disturbed when the quantities of dynamite had been fired. The plough only breaks up the top surface so that the water mingles and dissolves the plant nutriment to a depth only of a few inches. The sub-soil, however, remains intact, and the roots of the crop have to feed upon what they can obtain from the land broken up by the plough. But breaking the land up by dynamite disturbs it to a depth of several feet, letting in the water which dissolves the essential nutriment, while the roots are able to descend to a greater depth and thus secure their fill of food. Again, the roots are allowed to grow downwards and not laterally; thus they do not encroach on the feeding areas of the adjacent trees, which is the case when there is only a top shallow layer of porous soil.

"The planter in question, we understand, has applied the new method to five acres of land and planted rubber trees therein. It is, of course, too early yet to judge the results in the growth of the plants. If the results are as good as anticipated it is very likely that the method will be widely adopted in Ceylon. The Red Cross dynamite was mentioned in the article which we quoted, but these not being procurable, ordinary dynamite cartridges were used in this case.

"Now that a local planter has started the method here," continued the paper, in its comments on the experiment, "it will not be out of place to quote one section of a recent article on the subject, which is of especial interest to planters: " Possibly what at first sight appears to be the strangest application of dynamite is for the purpose of planting trees, yet its success in this connection is peculiarly remarkable. When a hole is made with a spade the surrounding soil is left in its hard condition. The result is that the roots find it difficult to start. They are cramped in the tight quarters of the hole and cannot pierce the surrounding hard wall of earth. Under these circumstances growth is appreciably retarded for a considerable time. With dynamite a large clean hole is blasted out and, in addition, the soil on all sides is loosened for five or six feet. When the tree is planted the young and tender roots force their way without effort through the crevices, sucking up nourishment, and commence to grow from the moment they are set, without any retardation whatever." Those qualified to speak upon the subject are of opinion that this will bring trees forward at least a year sooner that those planted under the old conditions."

"A new profession has arisen of expert dynamite farmers," says *The Wealth of India*, when commenting on the article in *The World's Work*: "dynamite is used for planting trees. "The spade-made hole leaves the surrounding soil in a hard condition, and the roots find it hard to start. With dynamite a large, clean hole is blasted out, and the soil on all sides is loosened for five or six feet, thus enabling the trees so planted to grow twice as quickly as those set in the usual spade holes."

"We heartily commend the subject of 'Farming by Dynamite' to our readers"—writes the Editor of *Greniers' Rubber News*, at Kuala Lumpur, right at the heart of the plantation rubber industry in the Far East. "The consensus of opinion at least among planters of the Federated Malay States, is that clean-clearing, which means the removal of all stumps and timber, is of paramount importance, and we feel sure that a perusal of the methods discussed" (in an article they published) "will convince planters that at last there is material available to accomplish the work expeditiously and economically."

"In South Africa," reports the *Home and Colonial Mail*—well-known throughout India and the East—"experiments in ploughing by dynamite are becoming quite popular. It is claimed that operations can be carried out without injuring crops, and demonstrations are now taking place all over the Union with object of fostering agriculture. The cost per acre is said to work out at between £2 10*s*. and £5 according to the nature of the soil and trees. Dynamite can be used for ditching, for constructing irrigation furrows, and other farming purposes."

All the leading papers in the rubber producing world, as well as those devoted to planting interests elsewhere, recommend attention to the use of dynamite for estate work. Its use especially appeals to me for out-of-the-way sections, and especially in Latin America, where the transport, even of the lightest make of ploughs, is difficult and costly, often impossible. In countries where the *tsetse* or other pest discourages the use of draught animals, the use of explosives should rapidly increase. Possibly the shocks, if not the actual explosions, might diminish the pests, especially if steps were taken to attract them to the spot by bait, in the shape of food to which they are partial. In locust infested soils, the numbers of these pests, at all stages, even when in flight, could be greatly reduced by organised explosions to greet them with a *feu de joie* whether in the soil as grubs or flying over it But there is no need to extend the list. You, whom I am addressing, are far more able than myself to think them out. I would, however, say in conclusion, that planters of cocoanuts, fibres, Ceará rubber, and other crops which can be grown to advantage, when scientifically cultivated, in almost semi-arid districts, will find the use of explosives a great aid as the following letter, written from Kalkudah, in the Eastern Province of Ceylon, to the Editor of the *Times of Ceylon*, (see their issue of June 20, 1912) tends to prove: —

"I read with great interest the articles *re* 'Farming with Dynamite' in the *Times of Ceylon*. I believe this method will gain popularity in the Eastern Province, as there is a slab of coral from the coast here to one-and-a-half miles inland, or further, and this runs from 2 to 9 ft. below the surface. in some places measuring 18 to 24 in. in thickness. It is not porous, but in some parts is soft and limy. There is water immediately below this slab, but the cocoanut roots cannot get to the water, and the trees are therefore greatly affected by the drought, and large sums of money have to be expended in watering plants. One notices patches of cocoanuts, old enough to give large crops, looking sickly, with not even a blossom on them. This is mainly due to the existence of this slab, which had not been broken through before planting out. Dynamite blasting will do more for these than tons of manure. A hole drilled in between every four plants through this slab and blasted with dynamite will crack up this slab, and enable the roots to find their way to the water, which is just underneath it.

"Again one finds that, after rain, the water remains in some places for weeks on the surface, affecting all the trees or plants in that area. This, too, would not occur if the slab were broken up, as the water would find its way through the cracks. In some places here, where this slab was broken through before planting out, the plants require very little watering, and the bearing trees are healthy and full of crop even during the severest drought. The method used in these places is to cut down to the slab and break it with pick-axes at a prohibitive cost. If holes could be drilled and dynamite used, the breaking up of the slab will be much greater and the cost less than half. Perhaps the cost of holing with dynamite and planting will be slightly higher, but there will be a great saving in watering, and the chances given to plants to strike root and bring them earlier into bearing will amply repay this. Even in bearing field where this slab occurs it would be well to have it broken up a little and allow the roots to find their own water.

"It would be interesting to hear of results of a few experiments and also have the views of some of the veteran planters of the Eastern Province on the subject."

In conclusion, I hope to see further reports on the matter, not only over cocoanuts, but in connection with rubber-planting and tropical agriculture generally. Meanwhile there is no doubt that explosives have not only come to stay as a necessary auxiliary to modern agricultural science, but their use will extend on all sides until they occupy a prominent position therein.—*The India Rubber World.*

DISTRICT PLANTERS' ASSOCIATIONS.

Shevaroy Planters' Association.

Proceedings of a Special General Meeting held at the Victoria Rooms Yercaud, on 30th April, 1913.

PRESENT.—Messrs. J. H. Bradshaw, J. A. Cochar, R. Gompertz, S. M. Hight, W. W. Hight, A. B. Kundaswamy, C. G. Lechler, L. Rochet. C. Rahm, W. Rahm, F. Pegge, F. D. Short, G. Turner and Ch. Dickins (Hony. Secretary and Chairman). *Visitors*:—Messrs. T. Bainbrigge Fletcher (Government Entomologist) and H. Whittle.

(1.) The notice calling the meeting was taken as read.

(2.) The Chairman in a short speech welcomed Mr. Fletcher to the meeting and referred to the experiments regarding the fertilization of Coffee blossom being carried out by Mr. Fletcher. Mr. Fletcher kindly answered a few questions put to him by the members, after which the business of the meeting was proceeded with.

(3.) *Muhammadan and Hindu Burial Ground.*—Read letter, dated 20/3/13 from the Dy. Tahsildar, Yercaud. The Honorary Secretary informed the Dy. Tahsildar that the side selected had been mentioned in an appeal to the Collector and District Magistrate, Salem, by the Residents of Yercaud. Steps adopted approved of by the meeting.

(4.) *Petty Bazaars Springing up in Yercaud and Other Parts of the Shevaroys.*—Read letter, dated 22nd April, 1913 from the Dy. Tahsildar, Yercaud. Members were requested to send in to the Honoray Secretary, as soon as possible, the names of bazaar-holders and the number of bazaars in their respective localities, attention having been called to the urgency and importance of the case.

(5.) *Scientific Department.*—Read Circular No. 2 13, dated 19th February, from the Secretary, U. P. A. S. I., *re.* the continuation of the Association Contribution to Scientific Department for the next 5 years, also Honorary Secretary's reply thereto promising same, which was approved of.

(6.) *Recruiting in a Planting District.*—After oonsiderable discussion on the subject the following gentlemen: Messrs. C. G. Lechler, G. Turner, C. Rahm and Ch. Dickins were appointed a Sub-Committee to draw up a Circular for distribution to Maistries and Headmen of villages in the Salem District,

(Signed) CHAS. DICKINS,
Hony, Secretary, S.P.A,

South Travancore Planters' Association.

Proceedings of the Second Quarterly Meeting held in the Club, Quilon, on Saturday, April 26th, 1913.

PRESENT.—Mr. A. W. Leslie (Chairman), Messrs. H. S. K. Morrell, T. P. Alexander, S. A. Martin, H. Irvine and H. C. Seymour, (Honorary Secretary.) *By Proxy.*—Messrs. E. Lord and J. B. Cook.

Agenda Papers —

1. Confirm Minutes of last Meeting,
2. Election of a Chairman for 1913.
3. Cooly Rates.
4. Election of a Delegate for Bangalore.
5. Correspondence.

and any other business properly brought before the meeting.

The minutes of the previous meeting were read and confirmed.

The next business on the Agenda was the election of a Chairman for 1913, Mr. Lord who was elected at the Annual General Meeting held in February being unable to accept the Chair.

Proposed by Mr. Morrell and seconded by Mr. Leslie: "That Mr. Brander be elected Chairman." This was carried unanimously.

Cooly Rates.—After a lengthy discussion it was proposed by Mr. Morrell and seconded by Mr. Alexander: "That there be no fixed rates."

Bangalore Delegate.—Proposed by Mr. Leslie and seconded by Mr. Morrell: "That as no delegate was sent in 1912 that Mr. J, B. Cook be asked to go."

Correspondence—A letter was read from ths Secretary, U. P. A. S. I. asking whether this Association be prepared to keep on the Scientific Officer for another five years. Proposed by Mr. Leslie and seconded by Mr. Morrell: "That the present contribution be continued for another year at least and that the Honorary Secretary write to the outside members to enable a date to be fixed for Mr. Anstead to visit the district once a year."

No reply being received with reference to the robbery on Ambanaad Estate it was proposed by Mr. Leslie and seconded by Mr. Alexander: "That the Police authorities be written to again on the matter."

This being all the business the Meeting closed with a vote of thanks to the Chair.

(Signed) HUGH C. SEYMOUR,
Honorary Secretary.

AGRICULTURAL EXPLOSIVES IN NEW ZEALAND.

Following the recent examples of South Africa and Australia, the officers of the New Zealand Government Agricultural Service are endeavouring to popularise the use of explosives in land cultivation.—*Commercial Intelligence.*

TEA.

The Indian Tea Industry.

The London *Times*, in an article on the "Indian Tea Industry," makes the following interesting comments on the present position:—

The growing importance of our Indian and Ceylon tea-planting industries, which now supply the world's consumers with about 490,000,000 lbs. out of the 720,000,000 lbs. more or less, annually required, and the attention that has been drawn to them of recent years as a desirable channel for investment, lend interest to the movements that appreciably changed the position and out-look of the tea market during the last two or three months, and raised the value of tea at the end of February to a higher average level than has been experienced for many years.

In our annual review of 1912 we recorded how the liability of the tea trade to be affected by unforeseen developments had been illustrated by the substantial decline in prices that occurred in the middle of the year, and we drew attention to the extreme sensitiveness of the market to comparatively slight changes in the balance between supply and demand, exemplified in 1911 by the inflation of low-priced tea through fear of a rather short supply, and in 1912 by its depression because there seemed to be a little too much of it. The relapse of the past fortnight shows that the market is still very sensitive, average auction prices last week 8·81*d.* for Indian, 9·18*d.* for Ceylon and 7·55*d.* for Java.

When it was necessary, three months ago, to analyse the position and examine the outlook the conclusion was reached that a recovery in value might come to pass later on, but could not safely be predicted as near at hand—for reasons set forth in detail. It has already taken place, however, brought about by a sudden and general recognition by the principal buyers of tea that a change was impending in the conditions that govern prices, and by the tendency to anticipate movements instead of waiting for them to take place.

The advance in prices was so general, and affected so many interests that it is worth while registering its extent. This can be done by contrasting the average of the prices obtained in February by the producers who sell their Indian, Ceylon, and Java tea at the London public auctions with the prices paid for them during the corresponding month in other years, with the following result:—

February Value.	1909.	1911.	1913.
Indian	8·40*d.*	9·80*d.*	9·25*d.*
Ceylon	8·35*d.*	8·75*d.*	9·30*d.*
Java	7·50*d.*	8·20*d.*	8·0*d.*

This marked recovery in the value of Indian and Ceylon tea places all our producers in a much better position than they were in six months ago.

But whilst a fresh and better outlook opened before the growers of tea, the reverse was the case with distributors and retailers in general, who had to face the higher cost with but little prospect of being able to raise the price charged to the public, owing to the strenuous competition between the large vendors of cheap tea. This would be especially felt by those who had resumed the sale of tea at 1*s.* the pound, which may have to be suspended later on, the 14*d.* tea made the lowest quoted again, and no tea eagerly pushed for sale for less than 16*d.* whether the Chancellor of the Exchequer be able to make any reduction in the duty or not and for this reason—namely, that whenever the duty is lowered the market price of tea in Mincing Lane will advance, unless it has been discounted by a rise in prices beforehand, The investigation steadily pursued through the records and details of the export business of the various producing countries in the East and of the requirements and purchases of the consuming countries and markets almost everywhere warrants the conclusion that the popularity of tea as a beverage, the trade inquiry for it, and the ability of consumers who most want it—namely, the world's hard workers—to find the money to pay for it are steadily growing, and in various directions. The statistics to illustrate this that have accumulated during the last few months are too voluminous for citation; nearly all countries seem to be wanting more tea than heretofore, but there is one that has been the particular factor of the changed position—namely, Russia, whose heavy purchases in the Calcutta market coincidently with active bidding for tea in London started the present rise. It is interesting to recall the fact that a similar demand from Russian buyers at the close of 1910, and its resulting deflection of supply from London was the cause of the advance in 1911. It is also of particular importance to notice that, when more tea is wanted now, it is to India that the buyers turn, then to Ceylon, or to Java if supplies of British-grown tea are inadequate or dear. These three countries are increasing the quantity produced and sold, whilst China's sales have reduced nearly 12,000,000 lbs. this season and Japan's industry makes no progress in the way of expanding exports.

But whilst the Russian demand was the principal cause of the advance, it has not been the only one, for coincidently with it came from India tea of better quality than before, then bad weather in Ceylon to temporarily shorten the export, a stoppage of the excessive output in Java, with a return to normal yield at the close of 1912, reduced receipts at the Port of London, with heavier deliveries for home use and export—the result of it being that instead of stocks in bond being 23,000,000 lbs. larger as they were at the end of November they are now of quite moderate and manageable dimensions.

In spite of the relapse since February the position may be said with some confidence to be one of hopefulness for our producers in India and Ceylon, partly by reason of its statistical soundness, but mainly because of the evidence that their tea is now almost everywhere recognized to be the best to buy. Apart from questions of taste which leads some consumers still to prefer other varieties but is a steadily diminishing influence—under the universal system of "blending" tea before retailing it, which obliterates or disguises distinctive flavours—the general verdict of tea tasters and traders is that our teas are the most economical, and it is economic value now, rather than taste, that turns the scale.

It would be well for the growers in India and Ceylon that the market value of tea should not relapse further, because it is difficult to see how a gradual increase in the cost of production can be avoided, although the effect of it is doubtless neutralized by the increased productiveness of highly cultivated estates that engage sufficient labour and spend money in manuring. There is a tendency for all but the fixed charges to increase; machinery implements, foodstuffs, carriage and freight, warehouse and dock rates tend to be dearer, not cheaper, while there is the chance that the world-wide movement that is raising the status of the manual labourer, whatever be his colour, will extend to the coolie that tea-planters employ, and that the form in which it will finally find expression will be, in addition to the better accommodation now so generally provided, a higher daily wage, perhaps paid direct into his hands if he has earned it; and it is quite possible that in return for it the planter will get more strenuous and regular service.—*The Indian Planters' Gazette and Sporting News.*

The Planters' Chronicle.

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THE U. P. A. S. I.

(INCORPORATED.)

Contents.

The Scientific Department of the U. P. A. S. I. publishes an article on the value of Neem Poonac, Husk and Neem Poonac, giving a table of their respective values, which conclusively proves the almost uselessnes of the former as a fertilizer. Those who purchase the former, after reading this valuable paper, will be buying an article hardly worth the cart-hire. Included in this article is another note of warning about Green Bug which has appeared in places so widely separated as South Mysore and South Coorg.

From Mr. Clarke comes an interesting letter pointing out the concession made by the Traffic Manager, S. I. Ry. and the advantage of shipping tea direct from Madras. The facility of shipping from Madras, now that boats can come up to the wharf, by which the risk of damaged tea is obviated, is remarked oh.

Rubber Planters will be interested in the two articles on Tapping Experiments in Kuala Lumpur by F. G. Spring who recommends the V shaped method of tapping as yielding a superior out-turn to others, and gives a return in tabular form of the 2nd year's results on six plots.

The second article is by Mr. R. H Lock on "The Intervals of Rubber Tapping." After many experiments he arrives at the conclusion that an increased rubber yield is arrived at by longer intervals of tapping. There are so many ways of tapping in favour and in force, that only by experiment and by publication will a universal means be adopted, adding to the life of the tree, its speedier renewal of bark, and increased yield.

At a time when the Scientific Officer is impressing on Coffee planters to provide themselves with sprayers, the publication of an article on experiments made with sprayers at Wisley before experts, comes most appropriately.

THE SCIENTIFIC DEPARTMENT, U.P.A.S.I.

Neem Husk.—It appears that in some districts when Neem Poonac is procured from village crushing mills the native vendors insist upon the Husk being bought also in the proportion of three of poonac to two of husk. The poonac costs Rs.45 per ton and the husk Rs.10 per ton, exclusive of freight. The question arises as to the manurial value of this husk, and a sample analysed in my laboratory gave the figures in the first column of the table below. The figures in the second column are those given by Mr. Harrison, the Government Chemist, *in Vol. III, Bulletin* 65 *of the Madras Department of Agriculture*, as being typical of a good neem-poonac.

	Neem Husk.	Neem Poonac.
Moisture	6·57	10·30
Organic Matter	79·77	...
Nitrogen	0·28	5·04
Soluble Ash	4·94	5·82
Insoluble Ash	8·72	3·19
Phosporic Acid	0·19	1·31
Potash	0·75	1·69

A glance at these figures will show that the husk is quite useless as a fertilising material. Leaving out of the question the fact that from the nature of the material it probably takes much longer to rot down and become available than the poonac, if its value is calculated on the basis of its Nitrogen content as compared with Poonac at Rs.45 per ton it is seen to be worth only Rs.2/8 per ton while Rs,10 is being asked for it. We may conclude from these figures that this material is not worth cartage to the estate especially when this costs Rs.7/8 per ton as it does in the particular case in question.

Green Bug.—The Green Bug is still giving a certain amount of trouble in Mysore, and another estate in the neighbourhood of Saklaspur reports its presence. It has also appeared unfortunately in one small area in Coorg. It is very obvious that this pest has got to be faced in the immediate future and planters must do everything in their power to be ready to tackle it seriously and to combine against it. On 20th May a combined meeting of the three Mysore Planters' Associations in which the Native Planters' Association are joining is to be held at Chickmaglur to discuss what steps are to be taken to prevent the spread of the pest. Probably the Mysore Agricultural Department will also be represented at this meeting and the Deputy Commissioner, Kadur district, has been invited to be present. The Assistant Scientific Officer for Mysore will lecture at this meeting on the "Green Bug" and its life history and explain the views of the Scientific Department of the U. P. A. S. I. as to how it may be controlled. It is to be hoped that the meeting will be well attended by planters and that some practical scheme will be evolved and *carried out* after it has been agreed upon. In any policy of control one man who will not carry out the measures which are recommended and agreed upon by the rest may destroy the whole attempts of the planting community to eradicate the pest.

It is very important to discover if possible how the scale has been introduced so that measures may be taken to check its further entrance. Personally I believe it will be found on the jungle trees in the neighbourhood of the infected areas and these should be carefully searched for its presence. In this work the assistance of the planters is urgently needed.

R. D. A.

CORRESPONDENCE.

The Editor,
Planters' Chronicle,
Bangalore.

Dear Sir,—I am always interested in the various papers by Mr. Anstead and others appearing in your paper but personally speaking as a beginner, I should be grateful to see more papers on one's ordinary everyday work. In my own case this would be anything in connection with tea—papers on tea manufacture, building, labour management, wire shoots, liquid fuel, factory, machinery, estate accounts, etc., would interest me personally very much and I daresay I should not be the only one.

Hoping you may be able to consider my suggestion.

Yours faithfully,
"X.."

9th May, 1913.

"Rob Roy," Kotagiri,
Nilgiris, May 9th, 1913.

The Editor,
Planters' Chronicle.

Dear Sir,—The following information may be of use to Tea planters situated near the S. I. Ry. in the Nilgiri District, or Anamalais, &c.

I have been in correspondence with the General Traffie Manager, S. I. Ry. regarding a concession for sending Tea from Mettapollium to Madras direct, as up to now there is none and the freight for a F C of 120 lbs. gross is Re.1/4/9 and H/C of 80 lbs is 13 annas 9 pies

The freight from Mettapollium to Calicut is 10 annas a F C of 120 lbs, as there is a concession and the rates are as follows:—

11 annas 1 pie per F/C and 5 annas 8 pies per H C.

From the above figures you will see that it will only cost me *4 pies* more per F/C to send it from Mettapollium to Calicut and then back from *Calicut* to *Madras*, than to send it direct from Mettapallium to Madras harbour. I pointed this out to the G. Traffic Manager of the S. I. Ry. and he has kindly replied as follows:—

I. From May 10th, 1913 Tea in chests or cases in any quantity at owners' risk from Mettapollium to Madras harbour *via* Jalarpet will be rated at 10 annas 8 pies per maund.

II. This rate is inclusive of the harbour charge of 2 pies per maund, and the combined rule does not apply.

III. Tea from Mettupallium to *Tuticorin* will be rated at 11 annas 7 pies per maund.

The above rates work out at Re. 1 per F/C of 120 lbs. gross against Rs.1-4-9 previously, and 10 annas 8 pies against 13 annas 9 pies previously, so this is a very appreciable concession for the Railway to have made us, and I trust that as many planters as possible will take advantage of it.

Then as regards Freight Home from Madras compared to that from Calicut, the following facts are worth noting:

Messrs, Parry & Co., write as follows:

Freight on Tea chests to London is: 30s. per ton of 50 c. ft.

The duration of voyage is about 31 days.

A Rebate of 10 *per cent.* on freight is allowed to shippers 6 months after shipment by the following Lines:

B. I. S. N. Co., Clan Line, City Line, and Hall Line, provided shipment is confined to them.

Freight.—Calicut to London by Coaster is 46s. 3*d.* per ton of 50 c. ft. or by direct clan boat 30s. per ton of 50 c. ft. *but no rebate is allowed.*

Then again one can't ship from Calicut from June to Sept, on account of the monsoon and of course putting the tea on board at Madras is far cheaper than at Calicut and far less risky as the boats now come alongside the wharf at Madras.

Altogether I think the above facts will show that we shall all be far wiser to ship our Teas from Madras in future.

Please publish in the *Chronicle* if you think this is likely to interest the tea planting community.

Yours faithfully,

(Signed) ERNEST S. CLARKE.

"Ceylon Labour Commission; Madras Eyes."—Mr. H. Scoble Nicholson's report of the operations of the Ceylon Labour Commission in India for 1912 is an unusually informing document, and throws some remarkable side lights on the question of emigration to Ceylon and other planting centres, says the *Madras Times*. In the absence of other assistance, it adds, we must take it that the Ceylon Labour Commission is doing a beneficent work in finding occupation and wages for a people who drag on existence on one poor meal a day! It strikes us as remarkable, also, that the landowners of the Presidency who complain of the drain of labour should not adopt measures to provide themselves with labour from districts where the conditions of life are so hard. It should not be difficult to effect a remedial movement of population in the Presidency Districts. It is quite clear that coolies go to Ceylon and the Straits Settlements only when they are in pecuniary difficulties and when famine conditions prevail, and the non-official members of the Legislative Council and the leading men in the districts, could, the Madras paper is sure, improve matters. It is also surprising that the various Planters' Associations in South India should not have discovered this state of things and done something to remedy this waste of labour which Ceylon Labour Commission now hopes to utilise. We have been disposed to believe that the drain of emigration was doing the agricultural industry in the Presidency infinite harm, but a perusal of the Report under notice has somewhat disturbed that conviction. It seems to us that if emigration is doing the harm to agriculture it is asserted to be doing, there would not be such dearth of employment, and such miserable wages as obtained in Cuddapah, Guntoor, and Nellore. The obvious remedy for local landlords and planters is in the direction of better wages and better conditions all round for their coolies.—*The Ceylon Observer.*

TAPPING EXPERIMENTS.

Preliminary Notes on Tapping Experiments at Kuala Lumpur.

SECOND YEAR RESULT—BY F. G. SPRING.

The results of the first year's working of this experiment were published in September 1912, Vol. 1, No. 2 of the *Agricultural Bulletin*, Federated Malay States. It my be remembred that the experiment is divided into six different systems of tapping which are as follows.

PLOT I.

System of Tapping—Quarter (Half Herring bone).

Two cuts 18 inches apart, twenty cuts to the inch.

Every day Tapping.

PLOT 2.

System of Tapping—Adjacent Quarters, Full Herring bone.

Two cuts 18 inches apart on each quarter.

Twenty cuts to the inch.

Alternate day Tapping.

PLOT 3.

System of Tapping—Singles, V, 36 inches from base of tree.

Twenty cuts to the inch.

Every day Tapping.

PLOT 4.

System of Tapping Double V, cuts 18 inches apart.

Twenty cuts to the inch.

Alternate day Tapping.

PLOT 5.

System of Tapping—Opposite Quarters. One cut of 36 inches on each quarter.

Twenty cuts to the inch.

Alternate day Tapping.

In each plot tapping areas are so marked out that the circumference of tree should be completely tapped in 4 years, thus allowing 4 years for bark each renewal.

The number of trees in each plot is 65. Distance of planting 16 x 16 feet.

The average girths measures 3 feet from the round in plot 1, 2, 3, 4, 5, and 6 at the beginning of the experiment were as follows: -20½, 20½, 21, 21 1/5, 21 3/5 and 21½. inches.

Before considering the results of the second year it would be as well to give the amounts of Latex Rubber, Scrap, Bark Shavings and total rubber obtained druing the first year of tapping. These figures are as follows:—

	Plot 1.		Plot 2.		Plot 3.		Plot 4.		Plot 5.		Plot 6.	
	lbs.	oz.	lbs.	oz.	lbs.	oz.	lbs.	oz.	lbs.	oz.	lbs.	oz.
Latex Rubber ...	125	2½	99	12	93	13½	95	13	90	6	74	6¼
Scrap ...	20	9½	13	12½	20	0	12	6½	22	11	16	14½
Bark Shavings ...	11	13½	12	3½	12	4½	12	15	15	15½	15	11¼
Total Rubber...	157	9½	125	12	126	2	121	2½	129	0½	107	0

In plots 1, 3 and 5, in which the trees were tapped every day, the results for the first year were not perhaps strictly comparable because whereas in plot 1, the tapping cuts had extended at the end of the year's experiment to the base of the tree, in 3 and 5, the upper 18 inches only had been tapped, consequently in the two latter cases there remained an untapped area of bark at the base of the trees, which according to what is generally supposed give a bigger yield of latex than any other part of the trunk. It would be expected, therefore, that in the second year of tapping the V would have an advantage over the single quarter system as the cuts forming it are 18 inches from the ground at the commencement of the second year while in the case of the single quarter there are two superimposed cuts of 18 inches. The results clearly show this. During the first year the single quarter gave more total rubber than the V but the second year the V is far superior. Taking the period of the two years there is an excess of 48 lbs. total rubber in favour of the V and considering that the number of trees in each plot is only 65 the difference is a considerable one. In both plots (1 and 3) tapping is conducted every day so that the excess of 48 lbs. must be due to the system.

Another series of experiments being conducted at Kuala Lumpur, which will be published later, the V is also found to be superior to single or opposite quarters.

It is satisfactory that the results of a number of different series of experiments all point in the same direction. There may remain a doubt with regard to whether the V or half herring bone gives the largest yield of total rubber over a number of years but the writer is of opinion that the V will be proved, in the end, to be the best system. There is little doubt that opposite quarters gives far less rubber than either of the other two systems.

Comparing plots 3 and 4 where the V is adopted in both cases. In number 3 there is one V tapped every day while plot 4 there are two Vs tapped alternate days. Over the period of two years the every day tapping gives an excess of 63 lbs. more total rubber that alternate, which works out at 63 lbs. per acre per annum calculating 130 trees to the acre. In the case of old rubber a larger difference would, in all probability, be found in favour of every day tapping. It has already been found that doubling the number of cuts and converting every day tapping into alternate days does not pay and it would appear also from the present experiment that less rubber is obtained from alternate day tapping where an equal amount of bark is removed in any time.

Judging from results at present being obtained, opening up young trees with a basal V has much to recommend it especially if this is continued the 2nd year by a basal V on the other side of the tree, and the 3rd year by a top V above the first basal V and the fourth year a top V opposite the V of the 3rd year. By adopting this method the V system of tapping is retained throughout.

Opposite quarters require little consideration as there is nothing to recommend it. It will be seen by referring to the tables that the amount of total rubber is considerably lower than that obtained from the V or single quarter. That the V is superior to opposite quarters is further supported by results obtained at Gunong Angsi Experimental Plantation, an account of which was published in Vol. I No. 4 of the *Agricultural Bulletin* Federated Malay States.

Second Year Result.

		Plot 1.				Plot 2.				Plot 3.			
		Latex Rubber		Scrap.		Latex Rubber		Serap.		Latex Rubber,		Scrap.	
		lbs.	oz.	lbs.	oz.	lbs.	oz.	lbs.	oz.	lbs.	oz.	lbs.	oz.
February	1912...	12	1	1	10	8	9½	1	2¼	34	7½	1	11
March	,, ...	10	11½	2	1	8	11	0	14½	14	2	1	12¼
April	,, ...	10	15	1	7½	10	9	1	0	15	4	1	11
May	,, ...	13	12	1	11½	13	9	1	7½	20	13½	1	14½
June	,, ...	13	7	1	14	13	4	1	1	20	3½	1	9
July	,, ...	17	7	1	10	17	14½	1	1	25	0	1	8
August	,, ...	16	2	1	11	23	9½	1	3	26	6½	1	8
September	,, ...	16	12½	2	3	22	13½	1	7	26	1	2	7
October	,, ...	19	3½	1	13	22	8	1	3	24	13	1	11
November	,, ...	17	5	1	10	22	8½	1	3	25	10	1	2¼
December	,, ...	18	4	1	9	24	2½	1	1½	27	10	1	3½
January	1913	16	9½	1	5	19	2	0	15	22	6	1	6
	Total...	182	10	20	9	207	5	13	11	262	13	19	8
Bark Shavings	...	11	10	...		15	7	...		11	1	...	
Scrap	...	20	9	...		13	11	...		19	8	...	
Total Rubber...		214	13	...		237	7	...		294	6	...	

		Plot 4.				Plot 5.				Plot 6.			
		Latex Rubber		Scrap.		Latex Rubber.		Scrap.		Latex Rubber		Scrap.	
		lbs.	oz	lbs.	oz.	lbs.	oz.	lbs.	oz.	lbs.	oz.	lbs.	az.
February	1912...	9	3	0	12	11	1	1	14	5	14½	0	15½
March	,, ...	10	3	1	1	9	12	1	14	7	1	1	3
April	,, ...	10	11½	0	15½	8	6	1	8	8	12	1	1½
May	,, ...	13	14	0	15	8	4½	1	10½	11	3½	1	6
June	,, ...	14	2	1	5	12	1	1	7¼	12	1½	1	2½
July	,, ...	18	11	1	1	17	6½	1	8	13	3	1	1½
August	,, ...	24	10½	1	2	13	9	1	10	12	4	1	5
September	,, ...	24	6	1	6	11	3	2	3	9	2½	1	4
October	,, ...	24	30½	0	2	10	11½	1	9	11	13	1	6½
November	,, ...	20	7	0	14	13	8½	1	8½	19	12½	1	10
December	,, ...	21	8	0	13	21	13	1	6	15	13	1	6½
January	1913...	20	9½	0	10½	21	12	1	6½	12	7½	1	4
	Total...	213	0	12	1	159	8	19	9	130	13	15	5
Bark Shavings	...	11	8	...		12	4	...		12	10	...	
Scrap	...	12	1	...		19	9	...		15	5	...	
Total Rubber...		236	9	...		191	5	...		158	12	...	

—"*The Agricultural Bulletin*" *of the Federated Malay States.*

RUBBER.

Intervals in Rubber Tapping.

We take over from the *Rubber World* (London) the following able contribution from the pen of Dr. R. H. Lock.

The majority of planters will probably agree that the ideal system of tapping rubber trees has not yet been devised. Even the question of paring *versus* pricking cannot yet be regarded as absolutely settled. At least two promising methods of incision or pricking are at the present moment under trial in Ceylon. The method of paring is, however, practically universal in estate practice, and it is with the paring method alone that we are concerned in the brief remarks which follow.

It is well-known that Fitting has laid great stress on the importance of limiting the amount of the circumference which is subject to tapping at any given period. Many practical people think that this writer has exaggerated the harmful effect of paring cuts which extend half-way round the tree or more. Nevertheless, there can be no doubt that Fitting is quite sound in theory. At the present time, in fact, there is probably a consensus of opinion among experts that tapping at any particular period should not extend beyond a quarter section of the tree, and that four years at least should be allowed for the renewal of the bark.

Mr. Herbert Wright, who is perhaps unique among those who control the fortunes of rubber companies in possessing the equipment of a thorough scientific training both in botany and in tropical agriculture, has preached for a good many years the gospel of conservation of the bark. The method of saving bark upon which Mr. Wright has laid the greatest stress is that of reducing the length and increasing the distance between the tapping cuts as much as is compatible with a full yield of latex. Whilst cordially endorsing the doctrine of bark—conservation, our present object is to discuss another method of bark-saving, namely, by increasing the interval between successive tappings.

The general practice on estates at present is to tap either daily or on alternate days. If the system of tapping single quarter-sections be adopted, the distance between the original cuts will be mainly determined by the rate at which the bark is used up, and this again depends upon the thickness of the parings removed by the tapper. This, if there are only 15 cuts to the inch, or 180 to the foot, one foot of bark will last a year if tapped on alternate days. For daily tapping on the same area, the original cuts must be marked out two feet apart. On the other hand, some estates report as many as 30 cuts to the inch. Where this degree of perfection is attainable, one foot of bark will last a year with daily tapping. In the majority of cases some intermediate distance will be required. With alternate day tapping, it is therefore clear that there should be no difficulty in deferring the tapping of renewed barg for four or even six years—a period which would probably satisfy the most exacting of botanical specialists.

The value of the policy of limiting the quantity of bark excised at each tapping, great as it is in theory, has yet a practical limit. In addition to the effect of tapping upon the tree, the question of economy of labour has also to be considered: If the yield of latex were simply proportional to the length of the paring cuts and if there were no need to consider the effect of tapping upon the tree and its future yield, the heavy tapping still in vogue on some estates would be fully justified on account of the economy of labour, When the coolie has once started tapping a tree, the rapid appearance of the Latex at once concentrates his attention on the work in hand. The tree finished, the coolie finds it necessary to stretch himself, to gather up his chattels in a leisurely fashion and so proceed to the next. It is between the trees that the time is chiefly wasted. Hence the total length of paring performed by one coolie in a day is greater when a few trees are heavily tapped than when a larger number is tapped more lightly. By increasing the interval between successive tappings, the tapping of renewed bark can be delayed for any desired period, whilst ensuring a reasonable task for the tapper on each tree.

This point would be of little importance of itself, were it not for the evidence which exists of increased yields of rubber per tapping when the intervals between tappings are increased. Careful and prolonged experiments on the effect of different intervals have been carried out in Ceylon under the direction of Dr. Willis, the former Director of Botanic Gardens, recently transferred to Rio de Janeiro, to Ceylon's loss and Brazil's gain. The experiments were carried out on old trees closely planted, and it is only to such conditions that they can be said at present to apply. The intervals between successive tappings on similar groups of trees varied from one to seven days and upwards. During the early stages of the experiment the total annual yield was greatest from trees tapped at the shortest intervals, and the highest yield per tapping was greatest from trees tapped once in three or four days. As time went on, the yield per tapping from the trees tapped at longer intervals steadily increase, until the annual yield from trees tapped once a week became as great as that from trees tapped at any shorter interval. It should be stated that by this time the trees tapped at intervals of one and two days had to be rested, owing to the imperfect renewal of the bark.

This result has been confirmed on a commercial scale. On a well-know estate in Ceylon, a field of old trees, closely planted, had been somewhat severely tapped at three-day intervals. The interval was increased to one of six days with little falling off in yield, whilst the labour bill was of course reduced by one-half.

We believe that the effect which has been described is due to the long continued influence of what is known as wound-response. Hitherto this expression has generally been employed in connection with the increase in yield often observed during the first few tappings of a virgin tree. It would appear that long continued tapping leads to a more permanent form of response - to what may be described as the acquirement of a habit of increased latex production on the part of the tree. The latex obtained by tapping at longer intervals contained a somewhat higher percentage of rubber than that yielded by the more frequently tapped trees, but this does not by any means account for the whole effect. The yield of latex was also materially higher in the former.

How far the principle applies to younger trees planted at wider intervals remains to be determined. But it is clear that the method is worthy of trial on a wide scale under various conditions. Such trial, however, demands very prolonged and careful attention. It is obviously futile to attempt to check the result of an experiment, carried out continuously over a period of four years, by tapping a few trees for three or four months. Nevertheless, the result of a single unconfirmed experiment can never be regarded as anything more than suggestive, and full experimental confirmation is eminently desirable.—*Grenier's Rubber News*.

SELECTED CUTTING

Spraying Trials at Wisley.

A trial of spraying machines was held at the Royal Horticultural Society's Gardens, Wisley, on April 23. Fine weather favoured the event, but did not tempt more than about a score of visitors to put in an appearance. The judges were Professor Maxwell Lefroy, Messrs. E. S. Salmon, F. J. Chittenden, Cecil H. Hooper, Henry Hooper, C. R. Fielder, and S. T. Wright. The work was done very thoroughly, the judges looking closely into the inner mechanism of the machines as well as seeing them put to the practical test.

The points to which the judges directed particular attention were: (1) The suitability of the machines for use with various washes: (2) general construction, including simplicity and accessibility of parts, ease of working and repair, replacement of parts, facilities for cleaning, durability, etc.; (3) the efficiency of the nozzles, and (4) the cost of the machines and accessories. The various machines were tried with lime wash, containing about as much lime as would be included in ordinary Bordeaux mixture. The efficiency of the nozzles was tested by directing the spray on to sheets of brown paper fixed to a temporary fence, as well as by casting it into the air. The only important point that could not be tested was the movability of wheeled machines on the rough ground of a fruit plantation, the trials being conducted in a smooth gravelled yard. In no case was the nozzle clogged, although the lime wash was supplied unstrained, and the competitors were required to pass a considerable quantity of it through their machines.

SYRINGES.

Messrs. G. and W. Purser, Ltd., 92, Hatton Garden, London, showed the Arnold syringe. The feature of this implement is that the nozzle requires no bend or elbow, the spray being directed either straight ahead or at an angle by simply turning the syringe in the hand. It has really two nozzles in one. When the bent nozzle is turned down the spray goes through the straight one; but on the position being reversed, a ball falls automatically and prevents the spray from going straight, so that it finds its way out through the bent nozzle. The idea is ingenious, but the arrangement did not seem to work quite smoothly in practice. Apart from this, the spray produced was satisfactory.

The syringe entered by the Four Oaks Spraying Machine Co., Sutton Coldfield, is notable chiefly for the corrugated outer cover of its barrel, which is claimed to be undentable. Two grades of nozzles are supplied in addition to a straight jet or a rose may be had instead of one nozzle. A good spray was produced.

The Abol syringe, shown by Messrs. E. A. White, Ltd., Paddock Wood, Kent, is very efficient, well made, and fitted with a drip-preventer. The nozzle produces a particularly good spray.

Messrs. Wm. Cooper and Nephews, Berkhamsted, sent one of their Protector syringes, the distinguishing feature of which is that the nozzle has a gauze strainer at the end.

KNAPSACK SPRAYERS.

For the majority of fruit-growers some form of knapsack sprayer is the most convenient type of machine. These are of two kinds: (1) those that maintain a continuous spray by means of compressed air, and (2) those that have to be pumped all the time whilst on the back. The advantages of the former class are soon appreciated by those who have to do a day's work with them. Sufficient pressure of air is pumped into the machine after it is charged with wash to expel all the liquid without further pumping, so that the operator has only to direct the spray when he gets the machine on his back. Two sprayers of this type were entered. The Holder sprayer, shown by Messrs. Hartjen and Co., 35, Noble Street, E. C., was of very sound construction. All seams are well riverted as well as brazed, and the metal is a brass alloy which does not corrode under the influence of the now popular lime-sulphur and potassium sulphide washes, facts which are important from the point of view of safety when considerable pressure has to be put into a machine. The cylinder is charged three parts full of wash (about 3¼ gallons), and air is then pumped in until the gauge shows 75 to 80 lb. pressure. This is done on the ground by means of a piston which is part of the machine. The pressure thus given is enough to spray out the whole of the liquid contents. The cylinder is slung on the back in an upright position.

The Alpha Knapsack sprayer, entered by Messrs. Robinson Bros., Ltd., Ryders Green, West Bromwich, works in a similar way to the last, but the air pressure is produced by means of an ordinary bicycle foot pump, which is detached after the machine has been charged.

The older type of knapsack sprayer, which has to be pumped all the time, was shown by Messrs. E. A. White, Ltd. (Abol), Four Oaks Machine Co., Cooper, Pegler and Co.. Ltd. (Vermorel), and Benton and Stone. Birmingham (Enot's). The sprayers of all these firms seem to do equally good work, but the over-shoulder action of the Four Oaks machine is certainly no improvement, as it is awkward, and shifts the machine on the back too much.

LARGER MACHINES.

Wheeled machines, with powerful pumps, become necessary where there are tall standard trees to spray. A good impression was made by Enot's Utility machine, shown by Messrs. Benton and Stone. Birmingham. This is in the form of an oblong, galvanised, 40—gallon tank, mounted on two large iron wheels for moving wheel barrow fashion. The strong feature is a very powerful and easily working pump, and the weak point is a somewhat inefficient agitator. The action of the pump causes two brushes to move against the gauze strainer and keep it clear, which is useful with a lime wash; but the brushes would be better removed when using a caustic wash, which would quickly wear them away. The machine was shown working two nozzles mounted on 6 foot lances. There are ingenious arrangements for clearing the nozzles should they become blocked.

The Four Oaks Bottle machine has an oval oak 18 gallon barrel mounted on two large wheels for moving in wheel barrow style. The pump is double—acting and easily removed for cleansing. Two 15 feet lengths of armoured hose are supplied, with nozzles on long lances. and there is a good agitator. The machine altogether is handy and workmanlike.

The Alpha machine differs from the preceding in being pneumatic. It consists of a cylinder to hold the charge of wash and compressed air, and a large supply - tank, mounted on a trolley, with four wheels, to be drawn by a pony. The cylinder is charged two thirds full of wash, and air is then forced in as in knapsack sprayers. But here there is a semi-rotary pump, which is worked at intervals to keep the cylinderfilled with wash from the supply tank, and the entrance of this wash into the cylinder at the same time maintains the air pressure. Thus the machine has to be charged with air only once for a day's spraying.

Messrs. Hartjen showed an adaptation of the knapsack sprayer in their Battery System. This is a device for charging a set of knapsack sprayers with both air and wash, the latter being contained in a large supply tub or tank placed on the ground in any handy position. The cylinder is set on a stand and charged with about 30 lb. pressure of air first. Then the wash is pumped in, which increases the pressure to 100 lb. or 120 lb. The orginal pressure remains in the machine, being kept there by its own pressure on a floating ball, which falls as the wash is exhausted. Thus one charge of air lasts for a whole day's work. The knapsacks are brought back to the tub from time to time to be refilled with wash.

SMALL HAND SPRAYERS.

Small pneumatic hand sprayers, holding about 4 pints, are very useful under glass or in small gardens, or for freshening up exhibits at shows. Such machines of very similar type were shown by Messrs. Hortjen, Cooper, Pegler and Co. (Vermorel), Robinson Bros. (Alpha), and Benton and Stone (Enot's). The first two have the advantage of an automatic stop-cock, the spray being turned on by simply pressing with the finger, and stopped by its release. The Enot machine has a safety valve to prevent overcharging. The Alpha is charged with a cycle pump, which reduces the cost.

BUCKET SPRAYERS.

The Arnold bucket sprayer, with galvanised bucket and brass pump, was shown by Messrs. G. and W. Burser. The pump is double-acting and throws a good spray, the piston being worked up and down with one hand, whilst the other directs the nozzle. The nozzles are similar to those in the Arnold syringe.

The Boundary Chemical Co., Cranmer Street, Liverpool, showed a pump to fit any bucket. This was sent with only one nozzle, but it provided an excellent spray.

The awards recommended by the judges will not be made public until they have been approved by the Council of the Society on Tuesday next.—*The Gardener's Chronicle.*

TEA IN 1912.

SCIENTIFIC MANURING PROVES ITS VALUE IN CEYLON.

One of the most interesting annual reports for 1912 is the one issued by Messrs. McMeekin and Co., on the World's Tea Market during last year. In this report questions affecting both production and consumption are exhaustively discussed in a way that shows an intimate knowledge of the trade. We quote the following:—

"For most of the interests dependent on the tea trade, 1910 may be held to have been a better year than 1912. The growers in every one of the great countries of production, taken in the aggregate, have had a record year for quantity, but in many cases the larger yield has been produced at the expense of quality and consequently of price. In India the average rate of yield per acre showed in 1912 a considerable increase, the figures being 504 lb., as against 466 lb. in 1910. The Assam district was responsible for the major portion of the increased crop in India (274,250,000 lb. for 1912 crop v. 269,000,000 lb. in 1910, or 5,250,000 lb. more). In Ceylon the effect of rubber growth is obviously telling upon many low countries estates, which were entirely interplanted with the new product, and some of these must soon disappear from the producing list. On the other hand, scientific manurial cultivation does not seem to have reached the limits of its results, and extensive new separate plantings in tea are rapidly approaching the stage of growing crops."—*Tropical Life.*

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(INCORPORATED.)

Contents.

Mr. Anstead, Scientific Officer, has gone on leave to Kotagiri for ten days and will not return till the 1st proximo, but all letters will be forwarded to him and will be attended to.

The Scientific Department publishes an analysis of two samples of Fish Manure.

That Green Bug is spreading is an unfortunate fact but the monsoon setting in will no doubt check it, and planters should be prepared with Sprayers to continue the work after the monsoon. One source of infection has been traced to the gourds grown by natives, but the Planting Expert is not resting in his investigation as to the original cause in Mysore.

We publish a letter from Messrs. Peirce, Leslie & Co., Ltd., Calicut, which, at the present moment, will draw attention to Sprayers. This firm believe that an unintentional injustice (where none was intended) was done them in our article on "Green Bug." The Planting Expert in that article rightly drew attention to the lack of sprayers, at the time he wrote, in Southern India and made no mention of any firms. At such a critical moment the Planting Expert exercised a sound and wise judgment in drawing attention to the melancholy fact that so few sprayers could be procured nearer than Calcutta, which has had the effect of causing these now absolutely necessary articles to be stocked in quantity in the near future.

We publish the minutes of two District Planters' Association.

At the time when the Tea season is commencing we think it advisable, to reach the individual Tea planter, to publish Circular 15 from Indian Tea Association dealing with the despatch of samples by post and also those sections of the Post Office Guide giving the method of despatching.

Some interesting experiments in manuring on a Tea Estate in Darjeeling are reproduced. From the tabular statement accompanying them, it will be seen how prohibitive chemical manures are, and the good results obtained from green manuring. It will be noted that it is the cost of transport in Darjeeling that makes the use of chemical manures so costly.

THE SCIENTIFIC DEPARTMENT, U.P.A.S.I.

Fish Manure Two samples of Fish Manure have been analysed in the Scientific Department Laboratory during the past week with the following results:—

	1	2
Loss on Ignition	69'53	61'30
Nitrogen	7'06	5'38
Sand	6'41	19'90
Soluble Ash	24'06	18'80
Phosphoric Acid	9'33	6'64

The first is a high grade Fish Manure. and though the Sand content is on the high side, it is reasonable. The second is very inferior stuff containing a large amount of useless Sand and a low Nitrogen content.

The second sample was of interest as it contained a number of beetles and their larvae. Specimens were sent to the Government Entomologist, who identified them as *Dermestes vulpinus* and *Necrobia rufipes*. Both beetles occur commonly in Fish Manure and since they feed on it they must reduce its value to a certain extent, but unless the manure is stored for a very long time the actual loss is probably negligible.

Lefroy figures and describes both these beetles in his "Indian Insect Life." The *Dermestidae* are a group of small beetles, some of which are household pests. The larvae, which characterised by the development of tufts of long hairs, are predaceous, or feed on dried animal matter like skins, horns, fish, &c. The length of the life history is not known, but it can be very greatly extended in every stage if food is scarce. *Dermestes vulpinus* appears to be a silk industry pest, as its larvae feed on the cocoons of the silk worms eating through the silk to reach the pupa within.

Necrobia Rufipes belongs to the *Cleridae* a large family of small brightly coloured beetles commonly found in the open on flowers, trees, grass, and carcases, &c. It is a household pest feeding on animal products.

Green Bug.—In the infected area in Mysore the rainfall has been short and the weather has been all in favour of the pest which has shown as increase on unpruned areas. Spraying, however, has been continued with success. It is almost impossible to spray big unpruned trees properly and it will probably be found that heavy pruning will have to be the first step in any really practical scheme for controlling the scale. It is almost certain too that an after monsoon spraying will be necessary. The main object of spraying is to kill the scales before they reach maturity and are able to lay eggs so that two successive sprayings at short intervals are apt to do more good than one spraying or treatment at long intervals. One spraying will not absolutely clean up an unpruned tree, but a second one, after an interval of a fortnight, will clean it up.

With regard to the source of the infection a valuable discovery has been made which throws a good deal of light upon the mystery and probably indicates the direction of the ingress of the scale. The native gourds which are grown on 'chupras' in every village and lines have been infected with a scale which is in all probability Green Bug. This plant is cut down every year or so and thrown on to the manure heap and it seems more than likely that this is one source of infection, as this bulk is always carted into the estates and always put to shuck coffee on which the Bug would get an easy hold.

Accumulation of Nitrogen in the Soil by Micro-Organisms.—Some recent work on this subject by Mr. J. Dvorak shows that the fixation of nitrogen in the soil by micro-orgnisms is of great importance. Carbo-hydrates supply assimilating bacteria with the necessary energy, and experiments in nutritive polutions with some vegetable substances which frequently come into contact with the soil and contain carbo-hydrates which can be utilised by bacteria lead to the conclusion that the older the vegetable matter the richer it becomes in ligno-cellulose and, consequently, the less it is adapted as nutriment for the bacteria. On the other hand green stuff, and in a lesser degree roots and straw, contain compounds which are easily changed into substances adopted to consumption by bacteria. There are other micro-organisms in the soil which prepare nutritive material for the nitrogen fixing bacteria, and there is a whole series of enzymes that render the carbo-hydrates soluble. Of all the substances tried, green stuff was the best nutritive medium for the development of bacteria. In it they find in favourable proportions carbo-hydrates and nitrogen, and in addition to this the carbo-hydrates are in a form which is more easily transformed by the enzymes contained in the bacteria themselves. Consequently green manuring increases the activity of bacteria, it causes a more intense respiration, and it raises the temperature of the soil, while the greater development of Carbon di oxide favours the porosity of the soil, and. in solution in water facilitates the disintegration of the insoluble phosphates and silicates.

Rubber from Malay.—The following are the official statistics of the export of plantation Rubber from the Federated Malay States during 1911-1912 given by the Board of Trade :—

	1911.	1912.
Total ...	19,695,330	34,718,015

Camphor.—The following table published in the *Chemist and Druggist* of March 29th shows the exports of crude and refined Camphor from Japan and Formosa during the past three years :—

Destination.	1910.	1911.	1912.
	Kin.	Kin.	Kin.
Hong-Kong	13,095	30,776	22.260
British India	452,881	570,714	643,745
Straits Settlements	4,973	8,146	9,814
Great Britain	657,838	657,657	724,250
France	872,534	795,893	502,996
Germany	357,024	520,387	489,317
United States	789,467	705,713	456.641
Canada	12,100	11,642	21,433
Australia	53,616	94,279	75,534
Other Countries	51,574	47,892	115,603
Kin (=1⅓ lb.)	3,275,102	3,441,099	3,062,462

R. D. A.

DISTRICT PLANTERS' ASSOCIATIONS.

Mundakayam Rubber Planters' Association.

Minutes of General Quarterly Meeting of the Mundakayam Planters' Association held at Yendayar Bungalow, on Saturday, May 3rd, 1913, at 10-30 a.m.

PRESENT.—Messrs. G. H. Danvers-Davy (Chairman), R. Harley, (Vice-Chairman), H. J. Byrne, E. S. Bonner, E. R. Gudgeon, C. Byng Hall, Ashton Hamond, H. M. E. Howson, J. Y. M. Henderson, R. C. Milbank, J. J. Murphy, M. B. Middleton, H. J. O'Reilly, F. Simmons, J. H. B. Sullivan, and Edwin Vincent (Honorary Secretary). *By Proxy*—Messrs. H. B. Kirk, and Eric Hall.

The Honorary Secretary having read the notice calling the meeting, the Minutes of the last meeting were taken as read.

Business—1. The recommendations of the Scientific Officer Fund Committee were put before the meeting as follows : –

(*a.*) "That Mr. Eric Hall be requested to withdraw his resignation from the Committee pending the result of correspondence to be exchanged with Messrs. Harrisons and Crosfield, Quilon."

(*b.*) "That the Association continue its subscription to the U.P.A.S.I. Scientific Department on the same basis as in previous year."

(*c.*) The Honorary Secretary read a letter from Mr. R. Anstead accepting the invitation of the Association to become an Honorary Member of the Committee of the Scientific Officer Scheme, also a letter from Mr. K. E. Nicol kindly consenting to help the Association in the selection of a suitable officer.

2. The recommendations of the General Committee were next placed before the Meeting, *viz* :—

(*a.*) *Building Rates.*—It was decided : " That Mr. Harley and Mr. J. R Vincent be asked to draw up a list of the rates which might be paid under reasonable conditions." Proposed by Mr. J. J. Murphy and seconded by Mr. A. Hamond.

(*b.*) *Purchase of a Typewriter.*—The Honorary Secretary having pointed out the necessity of a typewriter and duplicating machine, the Committee sanctioned the expenditure of not more than Rs.350 for the typewriter and further suggested the purchasing of a duplicating apparatus. The Honorary Secretary proposed a hearty vote of thanks to Mr. C. B. Hall for having kindly lent his machine during the past year. Seconded by Mr. Henderson and carried unanimously.

(*c.*) *Finance.*—The Chairman drew attention to the large balance lying to the credit of the Association at the Bank. Mr. Harley proposed and Mr. J. J. Murphy seconded : " That the Secretary invite suggestions as to how the money might most profitably be spent to the benefit of the Association, further that at the General meeting a Finance Committee be elected." This was seconded by Mr. J. J. Murphy.

The Chairman proposed the adoption of the recommendations of the Scientific Officer Committee and the General Committee, which was carried *nem.-con.*

3. *Private Membership.*—The Honorary Secretary asked for a ruling as to the election of private members. Mr. Murphy proposed: "That the words "at the direction of the Committee" be inserted in Rule 7 after the word "granted" and before the word "on."" Seconded by Mr. Hamond and carried unanimously.

4. Mr. R. Harley brought forward a resolution to the effect that the Postmaster-General be approached with a view to the conversion of the Mundakayam Post Office into a First Grade Office. In the course of his remarks Mr. Harley said that the conversion would mean greater facilities for the despatch of telegrams and money-orders as the hours of business would be extended. Mr. Harley mentioned that the money-order business alone at the Mundakayam Post Office totalled from Rs.17,000 to Rs.20,000 per month. The proposal was seconded by Mr. Hamond and carried unanimously.

5. *The Hours of Attendance at Out-Stations.*—In the absence of Mr. Kirk, Mr. Harley proposed that the Honorary Secretary should approach Government on this subject. Mr. Harley pointed out the extreme inconvenience caused to the general public by the variation in the times of duration of office hours at Out-Stations. Mr. Howson seconded the proposal, which was carried unanimously.

Item Nos. 6, 7. 8, 9, and 10.—These were resolutions handed in by Mr. J. R. Vincent and in his absence the Chairman called for the holder of his *proxy*. The *proxy* not being forthcoming the Chairman ruled that the discussion of the subject matter of Mr. Vincent's resolutions be held over.

11. *Correspondence.*—Read letter from the Executive Engineer informing the Association that the bridge work on the Lalam-Poonjar Road has been resumed and will be completed for traffic before the monsoon bursts.

Read letter from Mr. J. F. Fraser conveying his thanks to the Association for their vote of condolence in his recent bereavement. Read letter from Mr. R Harley suggesting the desirability of reserving 1,000 acres of land for grazing purposes at Mundakayam. Also letter from the Superintendent, Devicolam Division, asking the Association to point out where in Mundakayam without encroaching on private property, such selection could be made. Mr. Harley said he thought the land could be reserved on the road to Vellanadi between the 34th and 35th miles. The Chairman said he understood a petition was being extensively signed by cattle owners in Mundakayam for presentation to Government, pointing out the places which would be suitable for the purpose. Mr. Harley said that he was satisfied that Government would act on that petition.

12. The date of the next meeting will be Saturday, August 2nd, 1913, and it will take place, by kind invitation of Mr. H. B. Kirk, at Peruvanthanam Bungalow. Before the close of the meeting Mr. Murphy wished to be placed on record his opinion that the Chairman was not in order in refusing discussion of item Nos. 6, 7, 8, 9 and 10, on the Agenda.

The Meeting then terminated with the usual vote of thanks to the Chairman for presiding and to Mr. Murphy for his hospitality. Proposed and seconded by Messrs. Hamond and Howson.

(Signed) G. H. DANVERS-DAVY,
Chairman.

") EDWIN VINCENT.
Hony, Secretary,

Anamalai Planters' Association.

The Minutes of a Meeting of the General Committee held at the Valparai Bungalow, at 2 p m. on Monday, April 28th, 1913.

PRESENT.—Messrs. Geo. L. Duncan (Chairman), B. A. Marden, C. R. T. Congreve, and J. Hatton Robinson (Honorary Secretary).

AGENDA.

1. Whether combined action should be taken against a maistry of Mr. Simcock's for deliberately bringing a false charge against Mr. Simcock.
2. To review Messrs. Walker & Sons' Estimate for Aerial Ropeway.
3. Payment to Government for L. F. Hospital.
4. Mr. Marden's resignation as Vice-Chairman.

No. 1. As Mr. Simcock was unable to attend the Meeting, the subject was postponed.

No. 2. Messrs. Walker, Sons & Co.'s rough estimate for proposed Aerial Ropeway was discussed, and the Honorary Secretary was requested to go into figures, and to try and find out what the approximate transport of the district would be in 5 years hence.

These figures, together with copies of Messrs. Walker Son & Co's letter and estimate, to be sent to the various interests, when further action could be taken in the matter.

No. 3. The Meeting noted that Government had written asking that the full subscription for years 1911-12 and 1912-13 be paid.

The Honorary Secretary was requested to write and say that as practically all the subscriptions collected by the Association for the past year were paid under protest by the subscribers, on account of the very unsatisfactory way in which the late Sub-Assistant Surgeon, P. S David, attended to his duties, and also because of the fact that Government had not fulfilled its promise, and had not built a Hospital, but still kept the Assistant Surgeon in a very small building, lent by one of the members of the Association, not even keeping the necesssary hospital staff which would allow the Sub-Assistant Surgeon to do his work more satisfactorily. The Committee considered that Government could not be out of pocket to a very large extent over the L. F. Hospital, and that they were prepared to pay their share of the actual out of pocket expenses incurred by Government over the Hospital.

No. 4. The Meeting very much regretted that Mr. Marden was soon about to leave the district, and had tendered his resignation as Vice-Chairman. Mr. Congreve, as carrying the next greatest number of votes at the Annual General Meeting, will fill the vacancy.

(Signed) GEO. L. DUNCAN,
Chairman.
(Signed) J. HATTON ROBINSON,
Honorary Secretary.

CORRESPONDENCE.

Calicut, 9th May, 1913.

THE EDITOR,
Planters' Chronicle,
Bangalore.

Dear Sir.—With reference to the article on " Green Bug in Mysore " in your edition of the 26th ultimo, we would like to point out a slight injustice to us (we feel sure unintentionally) in the statement that " only three sprayers were available nearer than Calcutta ". We had in stock and supplied for use in this present outbreak 6 of our " Antipest " Knapsack Sprayers. We always carry a fair stock of these and under ordinary circumstances can meet all demands.

Yours faithfully,
Per Pro PIERCE, LESLIE & CO., LTD.
(Signed) K. LANGLEY.

Nagalur, Shevaroys,
14-5-13.

THE SECRETARY,
U. P. A. S. I.,
Bangalore.

Dear Sir.—With reference to our last proceedings published in *P. C.* 10th :—

(6.) Recruiting in a Planting District
I shall feel obliged if you will kindly insert the following in this week's *P. C.*—

" That owing to an oversight Mr. A. B. Kundaswamy's name was omitted in the Sub-Committee. Also that he rendered valuable assistance in translating the circular from English into Tamil."

I am,
Dear Sir,
Yours faithfully,
(Signed) CHAS. DICKINS,
Hon. Secy, S. P. A.

(April 1913.)

TREATING STUMPS WITH CHEMICALS.

Mr. C. T. Bruce, " Rosedale," Inkerman, sends us the following cutting from a New Zealand Journal :—

Bore a hole with 2 inch auger into the stump from the top; into this hole pour the following mixture (a pint for big stump, Nitric acid and sulphuric acid, equal parts. As soon as this is done the hole in the stump must be closed with a well-fitting wood plug. To do this well the plug should be dipped into liquid paraffin first. A stump so treated will be rotten in 30 days, roots and all; it will be a loose mass, and may be shovelled and spread over the land as manure.—*The Queensland Agricultural Journal.*

INDIAN TEA ASSOCIATION.

Royal Exchange Buildings,
Calcutta, 13th May, 1913.

Circular No. 15.

To

(ALL MEMBERS OF THE ASSOCIATION).

INDIAN POST OFFICE : SAMPLE PACKETS OF TEA.

Memo—I am directed to solicit the attention of members of the Association to the subjoined letter from the Postmaster General, Eastern Bengal and Assam Circle, with reference to sample packets of tea. Clauses 178 to 182 of the *Post Office Guide* are printed below.

(Signed) D. K. CUNNISON,
Assistant Secretary.

No. C.A.-370. dated Dacca, 22nd April 1913.

From—The POSTMASTER GENETAL, Eastern Bengal and Assam Circle,

To—The SECRETARY, Indian Tea Association, Calcutta.

I have the honour to say that the tea manufacturing season is about to begin and tea samples will be posted from now onward until the end of December. I beg you will kindly invite the attention of the managers of tea gardens to the necessity of strictly conforming to the conditions laid down in clause 178 to 182 of the *Post Office Guide* when preparing tea samples.

2. It sometimes happens, that the address labels get detached in transit and it would, I think, be a wise precaution if the addresses were written upon the bodies of the packets themselves as well as on the tag labels usually attached,

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INDIAN POST OFFICE.

Sample Packets.

178. *Contents and Packing.*—(1) Samples must be *bona fide* samples of merchandise, and must not have any saleable value. They must not bear any writing except the name or the commercial style of the sender, the address of the person for whom they are intended, a manufacturer's or trade mark, numbers, prices and indications relative to weight or measurement and dimensions, or to the quantity to be disposed of, or such as are necessary to determine the origin and the nature of the goods. They may be placed in bags, boxes, or envelopes ; but these coverings must be readily removable so as to admit of an easy examination of their contents.

Explanation.—Sample packets of cigars or other tobacco, manufactured or unmanufactured, addressed to countries other than the United Kingdom are regarded *by the Indian Post Office* as having no saleable value when they do not contain more than three cigars or three ounces of tobacco. It should, however, be understood that a different rule may be in force in the country of destination ; and senders of sample packets of tobacco must take the risk of having their packets returned, or charged with customs of other dues, when addressed to a country where the rule of the Indian Post Office is not accepted. As regards the transmission of spirits;

tobacco and tea by the sample post to the United Kingdom and certain other countries see the *Foreign Post Directory* included in this book.

(2) Packets containing samples of glass, liquids, oils, fatty substances, dry powders (whether dyes or not) as well as packets of live bees, are admitted to transmission as samples of merchandise, provided that they are packed in the following manner.

(*a*) Articles of glass must be securely packed (in boxes of metal or wood) in such a way as to prevent all risk of injury to the mails or to the officers of the Post Office.

(*b*.) Liquids, oils, and fatty substances easily liquified must be enclosed in glass bottles hermetically sealed. Each bottle must be placed in a wooden box furnished with sawdust, cotton, or some spongy material in sufficient quantity to absorb the liquid in case the bottle be broken. Finally, the box itself must be enclosed in a case of metal, or of wood with a screw top, or of strong and thick leather.

Note.—When use is made of perforated wooden blocks of the thickness of at least $\frac{1}{10}$th of an inch in the weakest part, with a sufficient quantity of absorbent material inside and provided with a cover, the block need not be enclosed in a second case.

(*c*.) Fatty substances which are not easily liquified, such as ointments, soft soaps, resin, etc., must be enclosed in an inner cover (box, bag of linen or parchment, etc.,) which must itself be placed in a second box of wood, metal, or strong and thick leather.

(*d*.) Dry colouring powders must be placed in bags of leather, rubber-dressed linen, or oiled paper of stout substance, and dry powders, not dyes in boxes of metal, wood, or cardboard. The bags or boxes themselves must be enclosed in a bag of linen or parchment.

(*e*.) Live bees must be enclosed in boxes so constructed as to prevent all danger and to allow the contents to be ascertained.

(3.) Keys sent singly, fresh-cut-flowers, objects of natural history, dried or preserved animals and plants, geological specimens and other similar objects, as also tubes of serum and pathological objects rendered innocuous by their mode of preparation and packing, are also admitted to transmission at the rates of postage for samples of merchandise, provided that they are not sent for a commercial purpose, and that they are packed in the manner prescribed for samples of merchandise generally.

179. *Postage.*—The postage on a packet of samples for the United Kingdom and for all other countries and places served by the Foreign Post, with the exception of Ceylon and Portuguese India, is half an anna for every two ounces or part of that weight, subject to a minimum charge of one anna for each packet, however small the weight. The postage on packets of samples for Ceylon and Portugese India, is the same as the postage on inland pattern packets.

180. *Size and Weight.*—In size a sample packet must not exceed 12 inches in length by 8 inches in width and 4 inches in depth, or if it is in the form of a roll, 12 inches in length and 6 inches in diameter and in weight it must not exceed twelve ounces.

In the case of the United Kingdom, the British Colonies of Hongkong, the Straits Settlements, the Union of South Africa, the Bechuanaland Protectorate and Rhodesia, a sample packet must not exceed two feet in lenght by one foot in width and one foot in depth, and in weight it must not exceed five pounds.

The conditions as to size and weight in the case of a sample packet addressed to Ceylon are the same as the conditions which apply to an inland pattern packet (sec clause 67).

Note.—As regards the limits of weight for sample packets of spirits, tea and unmanufactured tobacco addressed to the United Kingdom see *Foreign Post Directory* included in this book.

181. *Payment of Postage.*—Postage on samples must be prepaid at least partly (in cases were full prepayment is not compulsory). Samples for any Union country, if not fully prepaid, will be charged on delivery with double the amount of the deficiency,

182. *Penalty for Breach of Conditions.*—Packets of samples which are not prepaid at least partly, or which contain letters or manuscript notes having the character of actual or personal correspondence, or which are not made up in the manner prescribed or which exceed the limits of weight and size fixed by clause 180, or which contain anything having a saleable value, or which in any other respect do not fulfil the conditions laid down in the preceding clauses, will not be forwarded.

(April, 1913.)

THE RUBBER INDUSTRY IN QUEENSLAND.

In the Annual Report of the Department of Agriculture, Queensland, for the year 1911-12 (just presented to both Houses of Parliament) appears the following on the rubber industry:—

"The demand for this product is so great and the cultivation of it so easy, provided one can afford to wait until the tree is productive, that more interest should have been taken in its cultivation, if only as a substitute, should it be necessary for a farmer to give up the cultivation of the sugarcane. Though the area under crop is not yet sufficient to arrest the attention of the Government statistician, it is no new thing here, the first plantation having been made by Messrs. Seymoure and Allan as far back as 1890 on the banks of the Mourilyan Harbour. Unluckily for them they chose the wrong variety, and their venture was destroyed by a hurricane. In 1898 this department imported plants, and has also received consignments on many occasions since, but no material interest has been taken it, particularly in its natural country to the north of Mackoy, though rubber-growing trees are to be found on the coast from North to South of Queensland. At present it may be estimated that there are about fifty acres under Pará rubber cultivation, but this area, compared with the industry in New Guinea, is but infinitesimal. There, though the opportunities have been but of a much more recent date, the planters have begun to ship to Europe, while Queensland has lagged behind.

"It is now recognized by tropical agriculturists that the soil, climate, and rainfall in North Queensland are all that can be desired for the cultivation of rubber and cocoanuts. This is amply evidenced by the healthy appearance and rapid growth of such rubber trees as are planted at the Kamerunga State Nursery and elsewhere on the northern coast lands. —*Tropical Life.*

SELECTED CUTTINGS.

Experiments in Manuring on a Tea Estate in Darjeeling.

by

CLAUD BALD,
Manager, Tukwar Co., Ltd., Darjeeling.

It is impossible on a hill garden to find a continuous block of land where the quality of the soil is exactly equal over any considerable area, as the undulations of the land of necessity divert some of the best constituents of the soil into the hollows from the ridges, more or less, during heavy rain.

The block which was selected for these experiments seemed to all appearance as nearly equal in quality throughout as it was possible to obtain; and yet the event proved that there was some difference in favour of one side. The land was carefully measured, and the straight lines of tea bushes made it easy to plot off accurately four plots, each measuring half an acre. They were numbered from one to four. The land is slightly better in the direction of No. 4, which has been kept as the check plot. In regard to cultivation, pruning and plucking, all the plots have been treated exactly alike; so that the experiments might determine the results of the manuring only. The experiments were continued for three years. The diagram opposite and its explanation indicate the treatment and the resulting crop of tea for each year. The cost of manuring is shown on page 160. It will be noted that no farmyard manure has been experimented with; the reason being that on the estate no grazing is permitted, and there are very few animals kept, hence natural manure is not available in any considerable quantity, and it has become necessary to consider whether chemical or artificial manures can be applied in such a way as to prove remunerative.

In the first year the object was to find out whether the application of *castor meal* would give any encouraging result. An exceptionally heavy dressing was given to plot No. 1, while half the quantity was given to No. 3, and No. 2 was treated with *green manure* only. The green manure was a crop of *dal* similar to what is known as *Mati Kalai*. The crop for the year was largest from No. 4, the untreated plot, indicating that the castor meal had practically no effect upon the out-turn, while the better soil in the direction of No. 4 asserted itself.

In the second year Nos. 1 and 3 were treated with *chemical* manure, but *without nitrogen*, except the small quantity contained in the castor meal on No. 1. The nitrogen was purposely omitted, as it was feared that this manure would tend to the production of rank leaf, making coarse tea. No. 4 was again almost the highest in quantity of produce, but it was beaten by No. 2, which had been treated for two years in succession with green manure only.

In the third year No. 1 was treated with a *complete chemical* manure, with the addition of a small dressing of castor meal. No. 2 again had *green* manure only; while No. 3 had an application of *animal meal*. The nitrogen applied to No. 1 (in the form of ammonia), sent up the crop from that plot to the highest point; but it was closely followed by No. 2, which made an increase on its previous record. The check plot made rather less tea than in the previous year.

Some of the outstanding facts in connection with these experiments are the high cost of chemical and artificial manures in a remote district like Darjeeling, and the extreme doubtfulness of their economic utility; also the possibility of using expensive manures while accomplishing practically no result, in consequence of the manure used not being of a suitable composition; then there is the special outstanding fact that while green manuring is the cheapest method, it produces remarkably satisfactory results. It may be noted that the manures were used in one application only, as the nature of the ground was such that it was not advisable to dig at all during the rainy season, for fear of losing soil by wash.

An important fact in connection with the green manuring is that the crop was not dug into the land in the green state. It was only sickled when it came to maturity, and left as a mulch upon the ground until the rains were over, when the rotting stuff was dug in. At the same time a similar quantity of ordinary jungle growth was dug into each of the other plots. It is probable that the rotting leguminous crop contained a larger proportion of nitrogen than the rotting jungle; but in any case it seems that the special benefit which accrued to plot No 2 may be chiefly attributed to bacterial action on the roots of the leguminous crop.

The relative amount of crop having been determined as a result of the manuring, it remained to be seen whether there was any difference in the quality of the teas produced under the different circumstances. This is indeed the most important consideration of all on a hill garden, where the quality of the teas must of necessity be the first consideration. With a view to determining this a set of samples was carefully prepared from each plot, and reported upon by an expert. The valuations were 10½*d.*, 11*d.*, 9*d.* and 1*s.* per lb, of samples made from plots 1—4 respectively on 18th September, 1911. It has been felt, however, that in order to determine the real relative value it is necessary to have a series of samples drawn from the plots at stated intervals throughout the manufacturing season, as it is well-known that some of the chemicals are so evanescent that their effects upon the teas may be very great in the earlier part of the season, while other ingredients which only become absorbed by the plant after some months may have a very different effect upon quality towards the end of the season.

A digest of the results for the three years in crop and cost is as follows:—

Tea per acre in	1909. lbs.	1910. lbs.	1911. lbs.	Total. lbs.
Plot No. 1	... 247	265	345	857
„ No. 2	... 239	313	324	876
„ No. 3	... 258	270	312	840
„ No. 4	... 275	305	286	867

The cost of treatment works out as fallows:—

	Rs.	a.	p.	Rs.	a.	p.	Rs.	a.	p.	Rs.	a.	p.
Plot No. 1	...64	0	0	33	6	0	44	9	6	141	15	6
„ No. 2	... 4	9	0	4	9	0	4	9	0	13	11	0
„ No. 3	...32	0	0	16	6	0	15	14	0	64	4	0
„ No. 4 Check plot no expenditure.												

The total crop from No. 4 is comparatively high, because it stood relatively so high in the first year. Apart from the question of the relative quality of the teas produced, it will be seen that the extra crop from No. 3 is not sufficient to pay for the treatment which was given to it, while the cost of treatment to No. 1 is altogether prohibitive.—*The Agricultural Journal of India.*

The Planters' Chronicle.

RECOGNISED AS THE OFFICIAL ORGAN OF THE U. P. A. S. I., INCORPORATED.

VOL. VIII. No. 22.] MAY 31, 1913. [PRICE AS. 8.

THE U. P. A. S. I.

(INCORPORATED.)

Contents.

For the first time for a very long time the *Chronicle* is issued without an article from his hand or from the U. P. A. S. I. Scientific Department owing to the Planting Expert's absence on leave, and the railway strike which has prevented his contribution coming to hand.

Under the heading of correspondence a letter is published by "Sufferer" which is answered by Mr. Anstead, and shows how different are the conditions ruling on the Nilgiris and in Mysore.

Also, as affecting Tea Freights, we regret that an error on the part of the Printers, made Mr. Clarke's letter read incorrectly. We draw atttention to the paras in that letter which are now correctly stated.

The Planting Member issues a Note pointing out the misleading inference drawn from his Speech in the Legislative Council of Madras, at the Budget Meeting, by the *Times of Ceylon*, an inference that no fair-minded man could possibly have drawn from it.

A description of the methods of collecting Rubber in the Kasai District of the Congo is published, which increases our knowledge of a Rubber Producing country.

Soil Fertility and how to maintain it is, and must always be, a matter of interest to the Planting Community, and much is due to the United States Department of Agricultural Bureau for the interest roused in this important question.

Allied to the same question is that of the Chemistry of the Soil which is one which is continually discovering new wonders of the soil to the advantage of the agriculturist, if he will only profit by the discoveries.

Differing as the soils of the East do from those of the West, in constituency and climate, the proposals put forward to create a Tropical University or College where research work, pertaining to Eastern soils would receive close attention and turn out students with practical knowledge of the soil, should receive every support.

At a time when Sprayers are being inquired about, the award of the Spraying Trials at Wisley should prove interesting.

CORRESPONDENCE.

Green Bug.

Kinnacoorie Estate,
Kilkundah P. O.,
Nilgiris, 21st May, 1913.

THE EDITOR,
Planters' Chronicle,
Bangalore.

Dear Sir,—With regard to the treatment described on page 196 of Vol. VIII, am I correct in understanding that directly a shoot is found with Green Bug on it, it is cut off? As all new shoots seem to get covered with bug before they have grown many inches will not the constant cutting off of all shoots, and thereby keeping the trees constantly bare of leaves, affect the health of the trees before long?

"SUFFERER."

THE EDITOR,
Planters' Chronicle,
Bangalore,

Dear Sir,—I notice that your correspondent, "Sufferer," writes from the Nilgiris where the Green Bug problem is a very different one to that in Mysore. In the Nilgiris the pest has been established for many years and the jungle and even the shade trees are infested with the scales. There is little co-operation; while one man may clear up his estate his neighbours do nothing and, consequently, it is quickly re-infested.

In Mysore the pest has only just appeared, and comparatively small areas are attacked, and an attempt is being made to eradicate it at once by pruning off as many of the infested shoots as possible and burning them and then spraying. It is hoped to discover the source of the attack and take steps to prevent future infection. If all the planters in the infested area combine to carry out these methods there is every chance of eradicating the Bug.

In the Nilgiris this cannot be done under existing conditions, and, as your correspondent says, one cannot keep on constantly pruning off all the young shoots. He must depend upon spraying or brushing methods to keep the pest in check.

Yours faithfully,

(Signed) RUDOLPH D. ANSTEAD,
Planting Expert.

Referring to Mr. Clarke's letter of May 9th, in issue of May 17th, Paras. 3, 4, and 5 should read as follows:—

"The Freight from Mettapollium to Calicut is 10 annas a F/C of 120 lbs. as there is *no* concession, from Calicut to Madras Harbour there *is* a concession, and the rates are as follows: 11 annas 1 pie per F/C and 5 annas 8 pies per H/C. From the above figures you will see that it will only cost me 4 pies more per F/C to send it from Mettapollium to Calicut and then back from Calicut to Madras, than to send it direct from Mettapollium to Madras Harbour."

NOTE BY THE PLANTING MEMBER.

An article appeared recently in the "Times of Ceylon" which purported to deal with my remarks at the Budget Meeting of the Madras Legislative Council.

The article seemed to me to be misleading, so I sent, at once, a letter to the *Madras Mail* with a view to correcting any false impression that might have been created. Without amplifying what I said to any extent I think I should point out in the *Chronicle* that not only did I make no request of Government, but that it was impossible for me to do so. Nearly every association holds a different view of the labour question, and the views of individuals in the local associations differ also.

This was very apparent at the last United Planters' Association of Southern India Meeting and in consequence a Committee was appointed to consider the whole subject and if possible to suggest a course that may prove acceptable to all. It is obvious, therefore, that I can take no action until this Committee has completed its difficult task, and until its recommendations have been accepted by the delegates at Bangalore.

When speaking in Madras I wished to touch as shortly as possible on all the questions that affect us, and if the labour question took the prominent place the reason is obvious; it is of general interest, whereas the question of roads, railways, etc., though important, is of local interest only.

I had no intention of committing planters to any definite policy and I believe that any one who reads what I said fairly will admit that I have not done so.

(Signed) E. F. BARBER.

JAPAN.

The following information is from the report by the Acting British Consul at Shimonoseki (Mr. H. Horne) on the trade of that district in 1912, which will shortly be issued:

Fertilisers.—The year 1912 witnessed a strong and constant demand for *Indian rape cake*, of which nearly 15,000 tons were imported to Shimonoseki. Fertilisers in general and rape cake in particular are becoming increasingly popular with local farmers. The chemical qualities of this cake are so well adapted to the growth of tobacco, rice, &c., that the demand is certain to show a very material increase during the current year. *Bone meal* and *bone dust* are imported from Corea, China and India, but they are found less satisfactory than rape cake.

Sulphate of ammonia and nitrate of soda have given way to rape cake, which is much cheaper; the importation of the former, however, has increased considerably owing to the demand of the local ice factories, which have sprung into existence concurrently with the development of the trawling industry (see p. 263 of the "Board of Trade Journal" of 31st October, 1912). These factories have daily outputs ranging from 30 to 200 tons; when all are working at full capacity the daily output is nearly 500 tons of ice.—*The Board of Trade Journal*.

RUBBER.

Rubber Industry of the Kasai District of the Congo.

The following particulars regarding the rubber industry of the Kasai District of the Congo State have been received from H. M. Vice-Consul for the Kasai Province (Mr. H. H. Castens) :—

Wild Rubber.—Vast forests of rubber-yielding lianas or vines abound throughout the greater part of the Kasai as far south as latitude 6, and it is the latex from these vines which, when collected by the natives and bartered to Europeans, forms the principal industry of the district.

The following are the most common varieties of liana, and those which produce the best rubber :—

Landolphia Owariensis, which is perhaps the best known liana, is found throughout the district. It is a vigorous vine often attaining a length, of 300 feet and a circumference at the base of 18 inch, and has been known to yield 33'35 ozs. of latex in one year. The best quality of rubber produced from this tree is known as the "Kasai Rouge," but the natives are not disposed to incur the extra labour of cleaning entailed in its production, and so most of the rubber from this tree is sold in an inferior form known as "Kasai Noisettes," which sell for about 11 francs per kilog. (about 4s. per lb.) at Antwerp.

Landolphia Centilii possibly only a variety of *L. Owariensis*, which is considered by some people to produce the next best rubber, is found in almost all the forests. It is a strong healthy vine often reaching a length of 250 feet, with a circumference of 10 inch.

Clitandra Orientalis (—C. Arnoldiana) is widely scattered throughout the district. Its latex coagulates less rapidly than that of the above-mentioned two lianas. When thoroughly cleaned and boiled - it produces a rubber known as "Casai Noir I," fetching about 12'50 frs. per kilog. (about 4*s.* 6½*d.* per lb.) at Antwerp.

Landolphia Klainei flourishes in all forests bordering on the river. When immersed in boiling water the latex yields an excellent black rubber.

Landolphia Thollonii, or grass rubber, is only found in the more open country in the southern portion of the Kasai, where it grows profusely. It is remarkable for the manner in which its roots penetrate some 7½ to 9 feet into the soil, its rhizomes forming thick clusters beneath the surface. The natives pound the grass and roots into a pulp, in order to expel as much dirt and wood as possible. The residue is rolled into balls, which are threaded on sticks and are then ready for sale. On account of the dirty state in which this rubber is sold it only realises about 6 or 7 frs. per kilog. (about 2*s.* 2*d.* to 2*s.* 6*d.* per lb,) in Europe, but it is said that the rubber from the *Thollonii* is of excellent quality when properly cleaned.

Various other rubber-producing lianas grow on the Kasai but the product is of very inferior quality.

Collection.—The usual method of bringing the rubber to market is briefly as follows :—White managers are placed in charge of posts in suitable spots and supplied with a good stock of goods for barter. The principal articles exchanged are lengths of cotton cloth (indigo drill), blankets, salt, &c. These managers employ native overseers or "capitas", who are supplied with trading goods for which they agree to provide a certain quantity of rubber. The "capita" in his turn, pays the native rubber collector in advance to go into the forest to obtain the rubber. This is the general system, but the native collectors themselves sometimes bring the rubber to the posts or towns, where they sell it to the best advantage. The traders must then dry the rubber, as otherwise it would lose something like 20 per cent. of its weight in transit to Europe, and the majority usually clean it as well. The rubber is then packed in grass bags of about 30 kilogs. (66 lbs). and sent to a post on the river Kasai or Sankuru, whence it is despatched to Europe. The approximate cost of a kilogramme (2·204 lbs.) of rubber despatched from Lusambo to Europe is as follows:—

		Francs.
Freight—		
Lusambo to Leopoldville ...		... ·11*
Leopoldville to Matadi (rail) ..		... ·45*
Matadi to Europe ...		... ·9
Taxes—		
Export duty ...	60 centimes.	
Import general ...	75 ,,	...
Taxe de plantation ...	40 ,,	... 1·75*
(for wild rubber only)		
Incidental expenses (agency, &c.)		... ·20
	Total francs...	2·60
	equivalent to 2*s.* 1*d.*	

With the exception of the steamers plying between Leopoldville and the different posts on the rivers Kasai and Samkuru. and on the river Lukenge between Dekese and Mushi in the north, there are no means of transport other than the native carrier.

General Remarks.—It is estimated that from 1,800 to 2,000 tons of rubber are exported annually from the Kasai. of which the Kasai Company probably furnish two-thirds; no statistics on the point are, however, available.

The "Domaine de la Couronne," which is now thrown open to trade, abounds in wild rubber, though recent trouble with the natives may have debarred people from trading there to any extent. For similar reasons many other parts of the Kasai have hitherto been left untouched, but as the country becomes more civilised it seems probable that those who are first in the field should reap a rich harvest. The country in the neighbourhood of Basongo, on either side of the Kasai river, is said to be very rich in lianas, but few traders have yet commenced operations there.

Samples of various rubbers produced in the Kasai may be seen by British firms at the Commercial Intelligence Branch of the Board of Trade, 73, Basinghall Street. London, E. C.—*The Board of Trade Journal.*

SWEDEN.

Proposed Reduction of Duty on Superphosphates.

The Board of Trade are in receipt, through the Foreign Office, of information to the effect that a motion to reduce the Swedish Customs duty on superphosphates from 25 to 10 ore per 100 kilogrammes is under the consideration of the Swedish Legislature.

(Krona (100 Ore)=1*s.* 1⅓*d.*: 100 kilogrammes=220·46 lbs.).—*Board of Trade Journal.*

SOILS.

Soil Fertility and How to Maintain It.

The factors determining soil fertility are slowly being disentangled, but they are far from being fully known. Soil fertility is a condition of the soil and cannot be gauged by a chemical analysis of the soil which gives the total amount of plant food only as it depends on a great many factors, the texture of the soil, the rainfall, the amount of lime present in the soil and the action of bacteria, etc.

The texture of the soil can be improved by cultivation, the addition of organic matter, and in the case of stiff clay soils by the application of lime. Soil fertility depends partly upon the action of bacteria such as those that bring about the decay of nitrogenous bodies in organic matter, the final products being ammonia or nitrates, or that manufacture nitrogenous plant-food from the nitrogen of the air, as yet very little study has been given to soil bacteria in the tropics, all our knowledge is got from the study of soils in temperate climates, where conditions as to heat, moisture and soil chemistry are quite different. There are many kinds of bacteria in the soil and they occur in tremendous numbers, but those we are interested in, are the ones which elaborate nitrogenous food for plants. There are two groups, those which live in nodules on the roots of leguminous plants, such as tephrosia and dhaincha, and supply them with nitrogenous food, and those which live independently in the soil. Of the latter there are two varieties, those that break up organic matter and form salts of ammonia and on the nitrifying bacteria which form compounds of ammonia into nitrates, nitrates cannot be formed without basis, thus it is essential to have a plentiful supply of such bases as lime, potash, magnesia and soda in the soil, the most important of these is probably lime. Soils cultivated and uncultivated are usually acid in reaction and acidity of the soil is detrimental to nitrification, thus a minimum of acidity must be aimed at. Yet it might be said that a certain amount of acidity in the soil may be advantageous, as the acids will assist in liberating mineral food from the soil particles. Nitrifying bacteria require oxygen, thus to have conditions most favourable for nitrification the soil must be well aerated, good drainage and cultivation are essential for the perfect aeration of the soil. In a badly drained, water-logged soil, air is excluded and in the absence of oxygen denitrification takes place, that is, the nitrates are broken up and nitrogen liberated.

Recently soil investigations have discovered that it is possible to increase soil fertility by the use of sterilising agents, such as heating the soil to a high temperature or by the use of toulene, phenol, etc. It is found that such treatment is responsible for the destruction of organisms, which prey upon the useful bacteria and after treatment the nitrogenous food, forming bacteria, increase rapidly in numbers and become much more prolific than previously.

For some years the United States Department of Agriculture Bureau of Soils has maintained that infertility might and not infrequently does arise from the presence in the soil of toxic organic substances. excreted by the plants through the roots, but the toxicity is much reduced by the application of well-proportioned manure, but it is doubtful whether all plants normally excrete toxic substances.

It is recognised in almost all parts of the world, that it is necessary to keep up the soil fertility by approved methods. It is, therefore, necessary to find means to prevent deterioration, as well as to arrest it, where it is already in evidence. The tendency should always be towards improvement, for there is no soil which is absolutely perfect and under continuous cropping there is a permanent lessening of the available plant foods in the soil and to restore these a systematic employment of green crops and artificial manures should be practised.

The objects to be sought for in manuring may be briefly classified as follows:—

(*a*) The maintenance of the fertility of the soil and the health of the tea bushes.

(*b*) The increase of the yield per acre.

(*c*) The improvement in the quality of the tea.

The first of these is of the utmost importance for on it depends the permanence and future value of an estate. As regards tea properties noted for the depth and fertility of their soils, the intrinsic advantage they possess is very decided and as a consequence the need of artificial manures in their case is reduced to a minimum, as compared with other estates, where the tea and yield are inferior and the soil partially exhausted or originally of an indifferent character In both cases, however, the same care and attention are necessary to ward off deterioration of the tea. The commencement of deterioration is very often unnoticed or is only perceptible in the gradual reduction of the quality of the crop.

The actual yield per acre may in many cases continue well up to the average or even show an annual increase due to closer or more systematic plucking, yet at the same time the vitality of the bushes may be lessening and the supply of naturally available plant food material failing.

For estates with average soil or those where the tea is backward and the yield not more than 5 maunds per acre, the most economical treatment to employ in order to improve the condition of the property, is to adopt a thorough system of cultivation combined with the application in sufficient quantity of a well-proportioned artificial manure mixture—A. S.—*Indian Planters' Gazette and Sporting News*.

THE WATERING OF CUTS IN RUBBER TREES.

A paper has recently been published in the *Agricultural Bulletin of the Federated Malay States* (Volume I, No. 7) which is important from two points of view. In the first place it contains results that are likely to be of practical value, and in the second place it affords an example of an original investigation that has been undertaken by a planter. The first experiment in the investigation was designed to show whether the commonly practised custom of watering cuts lengthened or shortened the duration of the dripping period. In round numbers it was found that when the cut was watered the tree continued to drip for eighty-one minutes, when the cut was not watered, for 102 minutes: that when the tree was watered it yielded 250 drops, when not watered 510 drops. A second and more extensive experiment led to the astonishing conclusion that one thousand trees would give about ¾ lb. less rubber a day if water were poured on the cuts than they would give if the cuts were not watered.

The reason for this appears to be that the addition of water induces coagulation.—*The Agricultural News*.

SELECTED CUTTINGS.

The Chemistry of the Soil.

Considerable progress is being made in the important problem of the chemistry of the soil, and the investigations in this subject are being pursued nowhere so vigorously as in the laboratories of the United States Bureau of Soils.

Until recently our knowledge of soil chemistry was curiously vague. The mineral constituents were, of course, well-known, but the all-important organic substances which together constitute the humus were all but uninvestigated. This is the more surprising since, as all cultivators know, the constituents of humus are of vital importance in determining the value of a soil.

The work of isolating the various organic constituents of humus is of necessity laborious, yet it must be done if the biological value of these several soil-constituents is to be discovered.

The recent investigations of Mr. E. C. Storey (Bulletin 88 U. S. A. Dept. of Agriculture) have brought the number of known organic soil compounds up to 35, and it is certain that this considerable number will be increased enormously as a result of further investigations.

Of these 35 substances 13 are organic acids, 9 are organic bases, 3 are carbo-hydrates, 2 aldehydes, others are organic compounds containing sulphur or phosphorus, others again belong to the chemical classes of alcohols, hydro-carbons, etc.

Cultivators, no matter how lacking they may be in chemical knowledge, cannot fail to note with interest the general results of this chemical investigation of the soil; for the chemical composition of the soil plays a large part in determining soil fertility. On it depends not only the degree of growth of the plant he cultivates; but also, as it may be predicted, it controls the fungous and bacterial flora of the soil. With advance of knowledge of soil chemistry we may expect a much surer insight into the many mysteries of the soil—its harbourage of pests, its powers of recovery of fertility, and the like—which mysteries, though appreciated by the grower, baffle the wit of the scientific student.—*The Gardeners' Chronicle.*

Abyssinian Substitute for Tea.

At the opening meeting of the session in Edinburgh of the Pharmaceutical Society of Great Britain, the inagural address was given by Professor Ralph Stockman, who took as his subject "Stimulant Narcotics," with a special account of *Catha edulis*. The Swedish Botanist, Forskal, who died in Arabia in 1768, was the first to draw the attention of Europeans to the leaves of *Catha edulis* as a stimulant. The plant grows wild in Abyssinia and the neighbouring mountainous districts along the coast of East Africa. Its use is said to be older than that of coffee. The leaves have a pleasant aromatic odour, and an infusion made from them has a markedly sweet and stringent taste, somewhat resembling liquorice. In the social life of the Arabians and Abyssinians the leaves play much the same part as tea, coffee, cocoa, and other well-known stimulant narcotics do among other peoples. Professor Stockman had obtained three alkaloids in a state of purity, to which he gave the names of *cathine*, *cathidine* and *cathinine*. The first had an action something like a combination of morphine and caffein. *Cathinine* had not the same drowsy or depressing effect on the brain, but acted more as a stimulant to the spinal cord. *Cathidine* acted as a muscle poison and a slight stimulant to the nervous system. Broadly speaking, the action of the leaves was essentially comparable to that of other vegetable products which are used by mankind as stimulant narcotics.—*The Statesman.*

Carbon Bisulphide.

"The Agricultural Journal of the Companhia de Mocambique" has the following useful information on the value of carbon bisulphide :—

This chemical is chiefly known on account of its use against weevil, which is so often found in stored maize and rice. In order to encourage the use of this valuable insecticide the following notes have been prepared from "Farmers' Bulletin No. 145," issued by the United States Department of Agriculture, in the hope that they may be useful to farmers and others living in this territory : —

Carbon bisulphide is a colourless watery liquid, which is one-fourth heavier than water. It is very volatile, evaporating with great rapidity when freely exposed to the air. The rapidity of evaporation depends mainly upon the area of the surface and the temperature of the air. Water will float on the top of carbon bisulphide just as paraffin floats upon water. In a general way it is correct to say that carbon bisulphide is applicable only where its vapour can be more or less confined. It is especially useful in dealing with insects which cannot be reached by poisoning their food or by spraying. The vapour must be confined in order to maintain a sufficient proportion of it in the atmosphere to prove fatal to insect life. It tends most strongly to spread outward and downward on account of its weight, and though it will gradually work upward its greatest density will be at the lowest levels ; 1 lb. of carbon bisulphide is usually employed to each 1,000 cubic feet of space treated, whether for insects in buildings or in the ground. This amount gives an atmosphere of 1 part of carbon bisulphide to 90 parts of air, which is fatal to insect life in a short time. Where the atmosphere cannot be absolutely confined and the vapour may escape, two to four times the above amount may be necessary. In an atmosphere of 1 part carbon bisulphide to 90 parts of air, all insects perish in a few seconds : while in an atmosphere of 1 part carbon bisulphide to 254 of air, 1½ hours are required for their destruction. The same result is, therefore, obtained by a small proportion of vapour acting through a long time as by a large proportion acting for a short time.

Destruction of Ants.—By this means ants also may be destroyed. One or more holes are made in the nest with an iron bar 1 or 2 feet deep, and 1 or 2 oz. of carbon bisulphide are poured into each hole. The holes must then be immediately stopped up. A wet blanket put over the nest will help to confine the fumes. It may also be used for mole crickets living below ground.

Treatment of Stored Products.—Agricultural products are often stored in large quantities, and after a time become badly infested with insects. Beans, peas, maize, rise. wheat, tobacco, &c., &c., may all be affected. All buildings to be treated should be made as air-tight as possible, and the dishes to hold the liquid should be placed high above the floor. Shallow tin pans or plates make good evaporating dishes. The larger the evaporating area the better. There should be 1 square foot of evaporating surface to every 25 square feet of floor area, and each square foot of evaporating surface should receive from ½ lb. to 1 lb. of the liquid. When all the dishes have been filled, the place should be locked up for at least 24 hours. Thorough ventilation must be given for one or two hours before the building is again used. The vapour disappears rapidly in the open air, and after one hour there will be ordinarily no danger of entering a building which has been treated.

Seeds.—For the destruction of insects attacking seeds nothing equals carbon bisulphide. The seed to be treated should be placed in barrels, bins, or rooms, care being taken to have the receptacle tight round the sides and bottom. In such cases carbon bisulphide is generally applied at the rate of 1 to 1½ lb. to each 1,000 cubic feet of space, which is the capacity of a room 10 feet each way. A barrel would require more in proportion unless it were very tight. Heavy blankets or oilcloth may be used to cover small bins or barrels. The receptacle can be tightly closed for 24 to 36 hours, with perfect assurance that the germinating power of the seed will not be injured. The United States Department of Agriculture conducted experiments with carbon bisulphide upon 54 varieties of seeds. They were exposed to an atmosphere saturated with carbon bisulphide vapour for 48 hours. Under this extreme treatment, the severity of which would never be equalled in practice, the majority showed no injury. The seed of the grass family appeared more tender than others, and some suffered seriously. Those varieties injured in the first trial were treated again, but exposed for only 24 hours to a saturated atmosphere. The injury was markedly decreased in all cases. Experiments were also made upon grain in bulk, using 1 lb. of liquid to 100 bushels of grain, the exposure lasting for 24 hours. In this case no difference could be detected even in the most delicate seeds.

Effect upon Foodstuffs.—The opinion of those who have used this insecticide in mills, stores, &c., is that the vapour has no ill effect upon food. In fact no foodstuff has yet been found to be injured by exposure to carbon bisulphide vapour. By an annual application of carbon bisulphide to all mills, stores, &c., where grain and foodstuffs are kept, much, if not all, injury by insects would be avoided —*The Queensland Agricultural Journal.*

Awards of the Spraying Trials.

A report of the spraying trials held at Wisley on the 23rd ultimo was published in the issue for April 26, p. 274. The following recommendations of the judges have been approved by the Council:—

Syringes.—*Awards of Merit* to Four Oaks Undentable (Angle Bend excluded) and Abol Syringe (E. A. White, Ltd.). *Commended*: Corry's Syringe and Purser's Arnold Sprayer No. 2.

Bucket Sprayers.—*Award of Merit* to Boundary Co., Demon Continuous Spray Bucket Syringe.

Continuous Pumping Knapsacks.—*Awards of Merit* to Abol (E. A. White, Ltd.), and Two Continuous Knapsacks Eclair No. 1 and Etame (Cooper, Pegler and Co.). *Highly Commended*: Four Oaks Centre Knapsack Pump. *Commended*: Benton & Stone's Continuous Pumping Knapsack.

Large Pneumatic Sprayers.—*Highly Commended*: Hartjen Battery Filler and Holders.

Large Continuous Pumping Sprayers.—*Highly Commended*: Four Oaks Large Continuous Pumping Battery Sprayer, and *Commended*: Utility (Benton and Stone).

Hand Diffusers.—*Highly Commended*: Alpha Hand Diffuser, Alpha Extinguisher Co. *Commended*: Vermorel Hand Diffuser, Cooper, Pegler & Co.; Holder Hand Diffuser, Hartjen; Hand Diffuser No. 1,807, Benton & Stone.

Nozzles.—*Highly Commended*: Four Oaks Nozzles.

The Judges considered the provision of means of carrying accessory nozzles on the hand syringes would be a great improvement. None had such a provision. In using some spraying materials the provision of a strainer on the intake nozzle would be an advantage. W. Wilks, Secretary.—*The Gardeners' Chronicle.*

The Proposed Tropical University.

The proposal to create a tropical university which has been put forward in the columns of *Nature* and elsewhere is one which requires careful scrutiny and calls for a clear appreciation of the real issues involved.

It seems at least open to question whether the advocates of the scheme really contemplate a new university, or whether they are not rather thinking of a college or institute of university rank, the work of which should be somewhat intimately associated with the promotion of the material prosperity of the great agricultural interests that are growing up in the tropics. Such a college, in addition to the function of inducting men into the various branches of tropical agriculture, should serve, if properly staffed and organised, as a centre for the dissemination of current information on matters pertaining to the industrial needs of the community, in so far as agricultural needs of the community, and so far as agricultural problems are concerned. For this purpose it is essential that facilities for field and other experiments should be fully provided, and if the site were suitably chosen the college would prove an invaluable training ground, not only for the population resident within its immediate geographical area, but for others also, and especially perhaps for Europeans, about to engage in agriculture in any part of the tropics. Various places have been suggested as possible sites, and there is much to be said in favour of the West Indian proposal. Easy access from Europe, as well as the variety of soil, climate, vegetable products, &c., are all points in its favour, whilst the fact that no British institution of the kind desired exists in that region more, the possibility of securing a considerable range of advantages within a relatively small geographical area is of itself a distinct gain, for it could be more economically worked than a similar institute in a large continental area, where things are on a larger scale, quite apart from limitations imposed by a continental climate, which cannot be ignored.

Accepting for the moment the desirability of founding a college of the kind indicated, the danger that lurks in the scheme would almost certainly be found, in practice, to consist in a desire to see immediate results which would be convertible into a cash value by the planters. In order to ensure success, it is absolutely essential that a wise and far-sighted policy should guide the destiny of the institute. Agricultural problems, and especially tropical problems, are seldom simple, and while immediate practical objects need not, and should not, be lost sight of, the college would fail to justify its creation if it were to exist for these purposes alone. It must, while not neglecting the practical training of students in tropical agriculture, also include within itself, as a vitally essential part a body of first-rate scientific investigators and teachers, who will be able to seize upon problems and work them out. There must be no attempt to limit their work to the economic questions of the moment, for in cramping the spirit of investigation lies the way of throttling material progress.

Such a staff would, of course, cost money, and often the return might seem to be slow in coming; but it is impossible to over-estimate its importance. Indeed, unless a proper staff can be provided, the scheme is not worth pursuing, for the most that could then be hoped for would be a mere technical institute—a sort of edition *in parvo* of current planting practice, veneered over by a fallacious appearance of scientific equipment.

Now an institute such as is here foreshadowed would greatly gain by connection with leading institutions in this country. Science is growing apace, and particularly those branches of it which especially touch on agriculture. And, however able the staff, it could not hope to escape from the disadvantages inherent in a separation from the main clearing-houses of scientific thought. Some sort of association, then, with home institutions, such as the University of Cambridge, and the Imperial College of Science and Technology, for example, could not fail to be of advantage to all concerned. An association of this kind ought to be a real and not a merely nominal one, for only in this sense could it serve any useful purpose and provide for an interchange of knowledge and for the stimulation of ideas, Arrangements might, perhaps, be made for enabling suitable students of the college to visit this country and be received for a time in the home institutions, and *vice versa*,

Such a college, conceived and maintained on generous lines, would develop into a valuable asset to the Empire, and would exert a powerful influence in furthering the interests and objects of tropical agriculture within it.

Moreover, a centre of real university learning. and still less of culture, can scarcely be created by the stroke of an administrative pen, and it would, in any event, be compelled to seek its justification in the existence of a population large enough and able in other respects to utilise the advantages the university ought to be in a position to confer. And it seems open to inquire whether a mere fraction of the financial resources which would be needed for the more ambitious project might not amply suffice to enable everyone of marked ability to enter an existing university elsewhere, if he (or she) were otherwise unable to do so. There would be many disadvantages inseparable from a small insular university, and it is scarcely necessary to dwell on them here. For the present it may suffice to remark that a second-rate university is not worth its upkeep, whilst a properly staffed and equipped one would demand very considerable funds, and not only so, but other claims, difficult to meet, would also have to be satisfied.

The further one reflects on the matter the weaker does the case for the establishment of the university, and the stronger the claims for the foundation of an agricultural college, appear. Almost all the arguments which can be urged against the first proposition can be used in support of the latter. But it may be that after all a substantial agreement already prevails amongst the majority of those who are advocating the scheme, and that an agricultural college of university rank is really what is desired —J. B. F. —*Nature*.

It would appear from the recent annual report of the Decimal Association that the General Medical Council has announced that all measures and weights in the new British Pharmacopæia, including those referring to dosage, will be in the metric system, and that in order to facilitate the use of the work by medical men, the equivalents for dosage will also be given in the Imperial system. Further progress is also reported in connection with the adoption of the metric carat of 200 milligrams as an international unit for the sale of diamonds and precious stones. Owing, no doubt, to the steady advance made by this unit on the continent, the views of the trade in this country with respect to it appear to have undergone considerable change recently, and to be now generally in favour of the legalisation of the metric carat. It is confidently expected that steps will be taken very shortly by the Government to issue an order in Council legalising the metric carat as well as a series of multiples and submultiples of that unit. The effect of this legislation will be to render the present arbitrary and unrecognised carat illegal and to bring the weights and balances used by merchants and dealers for the sale of precious stones by weight under the purview of the local inspectors of weights and measures. A law has recently been passed in Belgium making the use of the metric carat obligatory in that country, and it is anticipated that a similar step will be taken at an early date in the United States, and possibly also in Russia.—*Nature*.

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THE U. P. A. S. I.

(INCORPORATED.)

Contents.

Mr. Anstead, Planting Expert, returned to Head Quarters on Monday, but left last night for Mercara to attend a special meeting in connection with the appearance of Green Bug in Coorg, and other matters. Letters will be forwarded to him.

The Scientific Department furnishes an article on Rubber Manuring. The Editor would draw attention to the last para; and notice is given of forthcoming Exhibition, and special attention drawn to the best way of sending plants for identification.

The Minutes of the Central Travancore Planters' Association are printed.

The Minutes of an important meeting of the Mysore Planters' Association are published, and it is to be hoped that the Mysore Durbar will pay attention to what amounts to a warning from the Combined Associations of Mysore, and in connection with this advent of Green Bug in Mysore, Mr. Kirwan writes that it has been decided that the Scientific Assistant's services cannot at present be spared to assist the Scientific Department in checking chemical fertilisers. At this somewhat anxious time it will be agreed by all that the combined Associations of Mysore have decided wisely.

From the *Tropical Agriculturist* we cull an article on Agricultural Education.

We may here mention that the *Tropical Agriculturist* has passed into new ownership—that of the Ceylon Agricultural Society, which assures a continuance of the same high excellence of matter and manner that has always distinguished this most useful Journal.

With Rubber Production in a state of infancy in South India we have thought it advisable to publish the opinion of two authorities on the subject of lack of uniformity in the Rubber sent to market.

It has been suggested that the Annual Meeting of the United Planters' Association should be held on August 25. The usual Exhibition will be held and assistance of all is solicited to make it a success.

THE SCIENTIFIC DEPARTMENT, U.P.A.S.I

Rubber Manuring.—In the course of an article on Malayan Soils in the *Agricultural Bulletin of the Federated Malay States*, 1.6, Mr. Barrowcliff says that in order to determine to what extent the cultivation of Rubber is depleting the natural resources of the soil, estimations were made of the quantities of the various plant foods removed in the latex and it was found that in producing a crop of 400 lbs. of dry rubber there are removed per acre per annum, 3½ lbs. of Nitrogen, 3 lbs. of Potash, and 1¼ lbs. of Phosphoric Acid. These quantities are very small indeed as compared with the amount of plant food removed by some crops. A certain amount is of course being stored in the trees themselves. The author remarks that it does not follow that the application of nitrogenous manures may not frequently be beneficial as a stimulus, but it seems that the promotion of natural bacterial nitrate formation by surface cultivation and liming should supply all that the rubber tree requires, practically all the Nitrogen thus taken up being returned at the fall of the leaf and seed to undergo again the cycle of change. Due regard will of course have to be paid to the risk of loss of nitrogen through excessive nitrate production and leaching from the soil. Experiments are recommended to test the following points:—

(*a*.) The extent to which lime can be safely and profitably added to the soil.

(*b*.) The use of Green Manures to improve the texture of the soil.

(*c*.) The use of Phosphatic manures and the conditions under which they will prove remunerative.

With regard to green manuring practice it is advised to use a plant which can be sown immediately before, and cut and dug in at the close of, the wet weather so as to avoid depriving the rubber of soil moisture in the dry season. The digging in of a green crop at the end of the wet season greatly lessens the subsequent loss of water by evaporation from the surface, the mulch formed breaking the continuity of the water film in the soil.

Mr. F. Wohltmann from a study of the analyses of Rubber soils, both Hevea and Ceara, in South America, and East Africa comes to the following conclusions:—

(*a*.) A good Rubber soil should be fine and of a medium coherence, rather loose than heavy, and deep. The combined fineness and depth of the soil bring about a dampness which appears to be indispensible to the formation of latex. Loams, or clay loams, with from 95 to 100% of fine particles are the soils to be preferred for Rubber, while compact clays are unsuitable.

(*b*.) It is not necessary that the Nitrogen content should be high. A large percentage of humus is perhaps injurious; 0·1% of Nitrogen is sufficient, especially in districts with a heavy rainfall.

(*c*.) Rubber trees only need very limited amounts of Lime and Magnesia but it is not yet known whether a high percentage of these ingredients hinder latex formation.

(*d*.) The rubber tree appears to have no special requirements as regards the Phosphoric Acid content of the soil.

(*e*.) It seems that a large amount of Potash in the soil promotes growth and formation of latex, and it is therefore advisable to use potassic fertilisers.

It will be noted that the conclusions of these two authorities do not exactly agree, but each is writing of a different country. Definite experiments are badly needed in Southern India to test all these points. When are Rubber planters going to undertake them?

Forthcoming Exhibitions.—United Empire (the Journal of the Royal Colonial Institute) says: "This year the Royal Agricultural Society is to hold its meeting at Bristol on Friday, July 4. The occasion has been taken to inaugurate an appropriate development in the practice of Britain's leading agricultural body. Several acres are to be devoted exclusively to exhibits from all parts of the British Empire overseas and from foreign countries. It is expected that this special section will be of a thoroughly representative character. This feature has been adopted on the suggestion of the Overseas Section Committee, who have been working hard to make known in Canada. Australia, New Zealand, South Africa, and India, the opportunity presented by the Bristol Exhibition to bring their natural products more prominently before the Old Country. There is a long standing and very intimate trade connection between most of these countries and Bristol. The Council of the Royal Agricultural Society have sent cordial invitations to the High Commissioners, Agents-General, and Representatives of all Overseas Dominions to take space at the Bristol meeting and to be present.

The Fourth International Rubber Exhibition will be held in London in June 1914. At this Exhibition the representation of interested Governments promises to be larger than at the previous Exhibitions. Not only Rubber, but all commercial products grown in tropical and sub-tropical countries will be shown. The President is Sir Henry A. Blake.

The First International Cotton, Fibres, Tropical Products, and Allied Trades Exhibition will run concurrently with the Rubber Exhibition, but will be separate in every detail. The two Exhibitions will be held under the auspices of the International Association of Tropical Agriculture, of which Professor Wyndham R. Dunstan, the Director of the Imperial Institute, is President. Professor Dunstan has accepted the Presidency of the Cotton and Fibres section of the Exhibition.

Specimens of Plants Sent for Identification.—Specimens are constantly being received for identification in an unsuitable condition. *Fresh material should not be sent* as it always wilts and spoils in transit. Herbarium specimens should be prepared and forwarded. In these notes on page 498 of Vol. VII a good method of preparing such specimens was given and this is now repeated.

"A botanical specimen is such a portion of a plant as may enable a botanist to determine its name, &c. Thus, of a tree or shrub, a shoot, say 6 inches or 9 inches long, bearing leaves, flowers, and fruit, if possible, will be sufficient. Of herbs when small, an entire plant should be sent, collected when in flower. Of herbs of a large size, a portion of the lower (radical) leaves and also a portion of the tip, in flower or seed. All specimens should represent the typical form not an abnormal or irregular growth, except to show such growth. After gathering, place the specimen between sheets of paper (old newspaper), and put the whole under a slight pressure; these papers should be changed for dry sheets every day for three or four days, when, if the specimens are not of a succulent nature, they will be in a fit state to forward by post."

In all cases several specimens of each kind of plant should be sent and great care should be taken about labelling. To each specimen a label should be securely tied on which should be recorded the locality in which the plant was found, the approximate date when it is in flower, the elevation at which it grows, the colour of the flower, and any other useful information, such as the local name, whether it grows in the open or in shade, in masses or singly, in damp or dry places, and so on.

R. D. A.

DISTRICT PLANTERS' ASSOCIATIONS.

Central Travancore Planters' Association.

Proceedings of the First Quarterly General Meeting of the above Association held at Ashley Bungalow on Saturday the 3rd May, 1913, at 10 a.m.

PRESENT.—Messrs. F. Bissett (Chairman), T. C. Forbes (Vice-Chairman), J. A. Richardson, R. D. Scoble Hodgins, J. S. Wilkie, H. C. Westaway. A. R. St. George, J. H. Ellis, F. W. Winterbotham, W. H. J. Milner, W. H. G. Leahy, (by proxy), H. C. Bracher, R. L. Goldsmith, Messrs. O. S. Barrow, A. Slater, and W. E. Forbes (visitors) and R. P. Roissier (Honorary Secretary).

The Notice calling the Meeting was read.

The Proceedings of the last Meeting were taken as read and confirmed. The Chairman said that he felt sure that they were all very pleased to have Mr. Barrow with them to-day and extended to him a very hearty welcome.

Finance.—It was resolved that the Subscription to this Association for the year be at the rate of 3½ annas per acre.

Correspondence.—Read letter from the Honorary Secretary, South Travancore Planters' Association, dated 12th March, 1913.

Read letters from Mr. Slater, Assistant Engineer, P. W. D., Peermade, dated 11th March and 11th April, 1913.

Mr. Richardson proposed a vote of thanks to Mr. Slater for having assisted them in getting Water Troughs for the Peermade Mundakayam Ghaut Road. Seconded by Mr. Roissier and carried unanimously.

Read letters from the Honorary Secretary, Kanan Devan Planters' Association, dated 19th and 27th March, 1913, also a letter from the President of the Madura District Board dated 14th April, 1913.

It was resolved :—"That this Association supports the Kanan Devan Association in a deputation to the Governor of Madras."

The Chairman proposed :—"That Mr. Richardson represent this Association in a deputation to the Governor of Madras to bring to his notice the necessity of bridging the Theni River for a light feeder Railway to Kuravanooth *via* Bodinayakanur from the S. I. R."

Seconded by Mr. Forbes and carried unanimously.

Mr. Richardson thanked the Members of this Association for having elected him.

Read letter from the Chief Secretary to Government dated 31st March. Read letter from the Resident of Travancore and Cochin dated 4th April. It was resolved :—"That the Honorary Secretary write again to the Resident on the subject of the Arrack Tavern at Kuttikanon and also point out this Association thoroughly approves of all the contents of the letter written by the Honorary Secretary dated 21st April."

Read letter from Messrs. Peirce, Leslie & Co., Ltd., dated 29th April. Read letter from the Secretary, U. P. A. S. I. dated 19th February. It was resolved :—"That this Association support and continue to contribute to the Scientific Department for another period of 5 years provided that the Madras Government give their support as before," Read letters from the U. P. A. S. I. No. 3/13 dated 3rd April, No. 6/13 dated 19th April.

Ropeway.—Mr. Richardson explained to those present the Scheme for the Peermade Ropeway, to be erected, and gave details of what had been done up to the present and also gave estimates for the approximate cost of this Ropeway.

The Chairman thanked Mr. Richardson for his remarks which were most interesting.

Breach of Contract Act.—This Act which is to be brought forward at the next Travancore Council Meeting was explained to the members by Mr. Richardson.

The Chairman thanked Mr. Richardson on behalf of this Association for the trouble he had taken over this Act.

Government Reserve Land.—Resolution by Mr. Richardson. "That this Association strongly objects to Government's action in placing the forest adjoining the following Estates into reserve:—

Ashley Estate.
Stagbrook Estate.
Vembenard and Twyford Estates.

Bison Valley Estate.
Mai Mallay Estate.
Woolands Estate.

These being some of the oldest Estates in the District their supply of firewood is getting short. These Estates always considered this forest available for fuel as the land is unsuited for Tea cultivation." Seconded by Mr. Forbes and carried unanimously.

Resolution by Mr. Bissett.—"That this Association wishes to draw the attention of the Postmaster-General, Madras, to the very unsatisfactory delivery of mails at the Peermade and Vandiperiyar Post Offices." Seconded by Mr. Ellis and carried unanimously.

Peermade Post Office.—It was resolved that the Honorary Secretary do write to the Postmaster, Peermade, complaining of the present slackness at the Post Office.

With a vote of thanks to the Chair the Meeting terminated.

(Signed) REGINALD P. ROISSIER,
Honorary Secretary.

DESTRUCTION OF LANTANA.

This plant is apt to become a great nuisance in tropical countries on cultivated and pasture land, owing to its dense growth and extraordinary vitality. It appears from the *Journal d'Agriculture Tropicale* (1912, 12, 154) that an attempt is now being made in New Caledonia to combat the pest by introducing a species of fly of the Agromyzidæ family from Hawaii. The insects have been distributed in the environs of Numea on land infested with lantana. As a result the larvae of the fly have been found in many of the seeds and it is intended to extend its distribution in the colony. The result of the experiment will be watched with interest; it must be borne in mind, however, that where a new animal species has been introduced to destroy some pest it has itself sometimes proved to be injurious in other directions.

Mysore Planters' Association.

Minutes of a Meeting of the Mysore Planters' Associations held at the Town Hall, Chikmagalur, on May 20th, 1913.

PRESENT—

Representatives of the North Mysore Planters' Association.
Do. Do. Native Planters' Association.
Do. South Mysore Planters' Association.
Do. Bababudin Planters' Association.

Mr. K. Krishna Iyer, Deputy Commissioner, Kadur District.

Mr. Khunni Kannan, Assistant Entomologist, representing Dr. C. L. Coleman, Director of Agriculture to the Government of Mysore.

Mr. G. N. Frattini, Assistant Scientific Officer (Mysore), to the U. P. A. S. I.

On the proposal of Mr. C. N. Chokkanna, seconded by Mr. C. Vasudeva Rao, Mr. W. L. Crawford was voted to the Chair.

Mr. Crawford in a few words explained the object of the meeting, *viz.*, to take united action to prevent the spread of "Green Bug" (*Lecanium viride*) among the coffee estates of Mysore; and to seek the aid of Government in the matter.

The Chairman next read a letter from Mr. R. D. Anstead, Planting Expert to the U. P. A. S. I.

Mr. Khunni Kannan gave a short address, explaining the life history of the "Green Bug" and an account of the havoc already wrought by it in Ceylon, Pulneys, Nilgiris, Shevaroys, etc.

Mr. Frattini next addressed the meeting giving an account of the outbreak in South Mysore and the measures advocated and adopted by the Scientific Department of the U. P. A. S. I. for its suppression.

A short discussion of the addresses ensued and Messrs. Khunni Kannan and Frattini replied to various questions asked by those present.

The Chairman then put the following resolutions to the meeting which had been drawn up and approved by the Executives of the four Associations represented.

1. To ask Government's aid to endeavour to locate the source of infection of the present outbreak of "Green Bug" and take steps to eliminate same.—Carried unanimously.

2. To ask Government to appoint an Inspector immediately to each district to inspect all estates that are not already under the observation of the Planters' Associations' Scientific Officer, with a view to localising the outbreak.—Carried unanimously.

3. That it appears to this meeting essential that Government should introduce some form of Local Pest Act in order to strengthen the hands of their Scientific Staff who may be employed in stamping out the Pest.—Carried 2 dissentients.

The Chairman on behalf of those present tendered his thanks to the Deputy Commissioner, Kadur District, for kindly attending the meeting; and also to Messrs. Khunni Kannan and Mr. G. N. Frattini for the instructive addresses they had delivered.

At the close of the meeting Mr. G. N. Frattini exhibited specimens of the "Green Bug" in sealed specimen tubes; and demonstrated, how, by means of a Lens the special marking of the Bug might be identified.

(Signed) W. L. CRAWFORD,
Chairman.

CORRESPONDENCE.

Council of Mysore Planters' Association.

Santaveri P. O.,
June 4th, 1913.

R. D. Anstead Esq.,
Planting Expert,
Bangalore.

Dear Sir,—At the Meeting of the Council held at Chickmaglur, on May 19th, I was instructed to write you with reference to your request for Mr. Frattini's services for the checking of Fertilizer Guarantees.

Owing to the outbreak of "Green Bug" on a few estates in South Mysore it is thought that Mr. Frattini should remain in the District for the present and devote his whole attention to devising means to prevent its spread.

It is hoped that later on in the monsoon it will be possible to allow Mr. Frattini to go to Bangalore and help you, as promised.

The Council very much regrets being unable to keep to its promise made to the U. P. A. Meeting, and to the inconvenience it may have caused you.

I shall be obliged if you will mention in the *Chronicle* that we hope to redeem our promise later but that at present, as I feel sure others will agree, it is not possible to allow Mr. Frattini to be absent from the District.

Yours faithfully,
(Signed) N. G. B. KIRWAN,
Honorary Secretary.

A further showing of Brazil's purpose to be up to date in methods of rubber production is now evident in Rio. It consists in lessons in rubber tapping, the teacher being Dr. J. C. Wills, the Director of the Botanic Gardens, who illustrates the methods followed in Ceylon and Malay States on *Hevea* trees, in the Botanic Gardens. A series of cinematograph views have also been taken of this work, which will be shown up the Amazon.—*The India Rubber World.*

The World's Production and Consumption of Rubber.—According to statistics published in Singapore, the total production of wild and plantation rubber throughout the world in the twelve months ended June 30, 1912, amounted to 93,669 tons, as compared with 79,302 tons in the previous year, and 76,026 tons in 1909-10. On the other hand, the total consumption of 1911-12, is returned at 99,564 tons, as compared with 74,082 tons in 1910-11, or an increase of 25,482 tons; whereas the quantity consumed in 1909-10 was only 4,037 tons in excess of the preceding year. The world's stocks of rubber on July 1, 1912, are reported to have been 10,181 tons, as against 12,563 tons on the same date in 1911. This is a reduction of 2,382 tons, and compares with an increase of 5,565 tons on July 1, 1911, as contrasted with the position on July 1, 1910. The considerable expansion in consumption in 1911-12 is attributed largely to the lower level of prices prevailing during the year.—(From the *Journal of the Royal Society of Arts.*

AGRICULTURAL EDUCATION.

British University of Tropical Agriculture.

Agricultural education has progressed recently by leaps and bounds, its larger growth beginning with James Wilson, United States Secretary of Agriculture, for now some sixteen years. We must give due credit to the Germans for their scientific study of agriculture in the 18th century and give special credit to Messrs. Laws and Gilbert, who, for more than fifty years at their own private Rothamsted Experiment Station in England, carried on a series of experiments and scientific agricultural research work, that was without any parallel in those days, and which became the inspiration of further research work on this side of the Atlantic, until to-day scientific agriculture has become the rule rather than the exception. All of this tremendous agricultural progress has occurred within the limits of the life of the writer. Sixty-five years ago he was the possessor of a book called "The Farm Book" and his farmer friends in those boyhood days used to laugh at the idea of looking into the lids of a book for items concerning farming when the art of farming could only be learned by actual practice in the field, by following the oxen or the horses in the field, and there, in personal intercourse with Nature as it is or as it was, to learn all of its mysteries.

In the United States the granting of certain lands to agricultural colleges became the start of many so-called colleges. These colleges, however, had to employ 3 teachers, as a rule, who knew nothing of agriculture. They did, however, know the ordinary school studies and more or less of Latin and generally something of Greek, as the teachers of these little collegiate schools were men of comparatively good education. It was a hard struggle with these little colleges to get them to adopt any agricultural curriculum and it is only within the last thirty years that agriculture has finally come into its own, the success of the various experiment stations founded by that apostle of agriculture, W. S. Hatch of Missouri, having given agriculture an impetus that has lasted until these days and is increasing in its momentum.

We are led to these reflections by the fact that Great Britain with its immense area of tropical lands, including the British East Indies and the British West Indies, its African and Indian Ocean and Straits Settlement lands, the Island of Ceylon and its control in various other tropical lands, all of a sudden, is now arousing itself to an appreciation of the fact that tropical agriculture stands in about the same relation to the tillers of the soil in these lands that it did three or four thousand years ago. The wonderful success of the British West Indies during recent years and especially in banana culture by American interests and the distribution of these bananas in the United States way up into Central Canada has taught the British at home the value of at least one new branch of agriculture and of commercial distribution.

We might state here how easy it would be to improve the agriculture in the East Indies when we say that about 35 years ago Ceylon produced over a million bags of coffee. The coffee trees were attacked by some insect and the coffee industry in a few years was practically destroyed. This led to the development of the tea industry in Ceylon and now Ceylon teas are actually driving China teas out of England. The United States being the chief consumer of China teas. The quick rally of Ceylon from one great industry to another shows the wisdom of these ancient peoples but they seem to have lacked initiative, or to have been content to carry on their work in the old ways for scores of centuries, apparently without hope of any material improvement.—*The Tropical Agriculturist*, *Volume XL*, *No. 5.*

RUBBER.

Ceylon Exhibits at the International Rubber Exposition of 1912.

INQUIRIES AND CONCLUSIONS.

Mr. F. Crosbie Roles, Ceylon Commissioner, at the International Rubber Exposition of 1912, writes an interesting report which is too long to republish, but from which we extract the opinions of two well-known Rubber Experts, one of whom wishes to be unnamed. These opinions should be valuable as showing the trend of the markets and above all of the purchasers of cured rubber. There is a Committee formed to study the question of the Standardization of Rubber, for at this moment there is a lack of uniformity in the rubber now being sold, and it is necessary for the producer to meet the wishes and tastes of the purchaser. As America takes more than half of the rubber, and as a large quantity of this rubber is shipped from London to the States, it is with a view to point out the necessity of uniformity that these opinions are printed for the benefit of the Rubber Planting Community of Southern India.

I wish to place on record two views which were expressed to me in detail. The first is by Mr. A. D. Thornton, Managing Director of the Canadian Consolidated Rubber Company, Ltd., with its headquarters at Montreal, and possessing the biggest factory in the British Empire. I met him several times in the early days of the Exposition, and when he returned to Canada he sent me the following communication :—

MR. A. D. THORNTON'S VIEWS.

My views regarding plantation rubbers are governed by my experience, so that anything I may write for or against these rubbers is absolutely without prejudice to the said rubbers or anyone connected with the same.

Looking back at my records I find that in 1905 I began to use plantation rubber; it came in small quantities, but so handsome was it in appearance when compared with other kinds that we were delighted with it, and immediately began to use it. We were quite disappointed with the results, *it was not as good as it looked*, and up to that time rubber was bought on appearance only. With the aid of the laboratory, however, we found that there were ways of using it to advantage, which we did and have been doing up to the present time. I am a great believer in plantation rubber, because I am forced to be. I am convinced that in a few years wild rubber will prove to be a very poor second. In the meantime, however, we have much to learn, both at the producing end and that of the consumer at the factory.

And so I must tell you what I want. This morning a broker offered me a parcel for first latex crépe; frankly, I did not know just what he was offering; of course I know the name, but I am not able up to the present time to commit to my *mind* and *memory any particular grade or style* of plantation rubber, which I feel *sure of getting* if I buy first latex crépe by name only, and fail to obtain a sample of each particular lot offered for sale, and so I want to *know* just what I am buying.

A great objection to this rubber is the way London importers, &c., handle it. During the year I received a 5-ton lot of biscuit and sheet from London. There were eight very distinct grades in the parcel—some smoked, some not, some crépe, some sheet, some fairly strong, some very weak, some pale and some dark—and the variation in vulcanization was simply astonishing. Of course we refused the parcel; it was quite out of the question. This kind of thing leaves a nasty taste, and one is liable to swear he would not use any more of it. Of several lots I have bought direct from Colombo I have never once had any trouble, and at this moment I feel it much to our advantage to buy that way. For that reason I am aiming to obtain some means of being able to know just what I am buying when I am offered a parcel by means of the cable.

As regards reclaimed rubber, I am not inclined to think that it can ever replace crude rubber. If we could return old rubber into its crude state the matter would be different, but it is as impossible as it is to turn bread into flour again. True it is used in vast quantities, but this is only an aid to crude rubber; it does not *replace* crude rubber but it does replace chemical compounds, and it does thus enable us to make rubber goods at a price which is within the reach of all.

I do not think for a moment that crude rubber, even at an extremely low price, will do away with reclaimed rubber, for we must bear in mind that scrap rubber has no value; it is not produced, it is really rubbish. Its first value is fixed by the demand, so that old auto tyres if they were one cent per lb. instead of nine as at present would still be gathered by the scrap dealers, and should the time ever come that such prices prevail, the consumption of rubber goods would be enormously increased from what it is now.

As to the quantities of reclaimed rubber used, it would appear to me, after much consideration, that where 1 lb. of crude rubber is used that 1½ lb. of reclaimed rubber is also used, for while little or no reclaimed rubber is used in the highest grades, most of the low grades are loaded at the limit.

ANOTHER AMERICAN VIEW.

A New York gentleman, who wished to go unnamed, but whose position as arbiter as to what rubber is to be used in the largest rubber manufacturers' combine in the United States would not be disputed, put the matter thus:—

The American Manufacturers in handling plantation grades have found that the greatest difficulty in their use is the lack of uniformity of quality; the rubber coming as it does from a number of plantations and delivered through London in the auctions is repacked, and though any attempt to keep colours uniform, the quality is not such. The lack of uniformity was discovered by various manufacturers making complaint in the past that one lot would work better than another, and upon examination it was found in tracing the shipments, that the poor lots, or those that did not work well, came from new estates, and that the rubber was weak. This in a way has been obviated by the trees becoming older and the latex better, also by the care which is taken in coagulating. The use of plantation grades was forced upon the manufacturers all of a sudden. Previous to 1909-10 they were experimenting in a small way with these grades, but the high values that were experienced in 1909-10 obliged all manufacturers to set their chemists to work to find a substitute for the then high prices of Pará grades. These chemists have done more to promote the future of plantation grades than anyone else and all manufacturers now have adopted the use of plantation grades to rubber. The very fancy light coloured crêpes are only used for special purposes. The manufacturers making a general line of goods give the preference, when price is in proportion to the medium, brown or darker colours. To day it is estimated that in the working of plantation grades they are worth to a manufacturer about 5 per cent. below the value of fine Pará, but if this value could be at a uniform difference of, say 15 per cent., a greater amount of plantation grades would be used. To-day the preference is given to plantation grades; and wild rubber, including fine Pará, but more especially the African grades are being eliminated, and these eliminations will continue as long as the relative price between the plantation and African grades remains at present levels. The experience of the manufacturers with plantation grades is similar to that which was experienced with Guayule when it first made its appearance in this market. No manufacturer would use it in an experimental way on account of the condition in which it was arriving in the market. The quality then was very poor, but since then experiments have been made and the quality been brought to a higher standard, and all manufacturers readily take it and use it in their compounds to the extent that, say, in 1910 America alone was using some 13,000 tons. There is no doubt but with the prominence that plantation grades are receiving and the great attention that is being paid to their betterment by the planters that they will experience the same betterment that was experienced by Guayule, and that when the production increases, as it is estimated it will increase, the future will see much more uniformity of quality and larger percentages used.

The American market can see at present why there is not a larger business done in these grades direct, not causing them to purchase through London. They understand that a great many of the companies have their home offices in London, and are required to ship their product through that market. A much larger business could be done, if done direct, the cost of shipping to New York is estimated at 5 per cent. cheaper than shipping through London. In London heavy commissions are paid, rubber is required to be warehoused, sampled, and numerous other charges attached, which do not occur in this market. The only charges there would be on direct shipments to America would be freight, insurance, 1 per cent. commission for selling, and a small charge for weighing and custom house entry, and the rubber upon arriving would be delivered *ex* dock with no store charges attached. If business could be done by purchasing at Colombo, Singapore or other Middle East markets at a f. o. b. price, the seller allowing the purchaser in this calculation a part of the saving over shipment through London, we have no doubt but that a greater and more profitable business could be done. America to-day uses the largest percentage of the output of the Middle East, and it is equitable that they should not be required to make their purchasers through London, and it would be more to the advantage of the plantation to sell them direct. You are aware that in this market there have been dealers who have misrepresented these grades. For instance, the output of the highland smoked sheets is only a small amount, while hundreds of tons of this grade is sold each year. It would be to the advantage of the plantations to brand their rubber in such a way as to prevent imitations being sold as the original article. It has been said by shipping in the original packages that this could be overcome and each estate's rubber being distinguished by the mark on the package. This would be in order if on direct shipment, but when shipment comes through London the various estates are mixed. We look upon it to be caused first by the small amounts that are being offered from each estate at the auctions, these lots are bought and packed, attention being paid only to quality and colour. The original packages from the Far East are too frail to allow the opening for tarring and re-coopering for reshipment to America, and would not stand the voyage; for this reason the original packages are discarded and new packages much stronger and larger are made, so that it is very seldom that on shipments coming from London, the dealers receive the original packages as shipped from the Middle East.—*The Tropical Agriculturist, Vol. XL. No. 5,*

The Synthetic Chemist and His Raw Materials.

From the point of view of riders of that amusing but expensive and unremunerative hobby, the search for synthetic rubber, the price of turpentine will always have a distinct interest. Messrs. James Watt and Son, in their report on rosin and turpentine in 1912, state with regard to turpentine that the greater part of the year 1912 was a long reaction from the inflated prices of 1910 and 1911. The rise from 25*s.* 6*d.* in April, 1909, to 74*s.* 3*d.* in March, 1911, was followed by a fall to 27*s.* in November 1912. During the month of December the market was subject to violent oscillations, the extremes being 31*s.* 9*d.* and 27*s.* 7½*d.* The average price for 1912 is slightly below that of 1909, but above that of 1908. Lower prices have increased the consumption. In America the present crop promises to be at least as large as that of 1911-12. In France much the same conditions have prevailed. Spain and Portugal appear to have had good crops during the past year. Many other countries are bestirring themselves to tap their pines for turpentine, either as a new departure or with increased energy. The imports into Great Britain from all countries amounted during the year to 32,811. tons. The average price of American turpentine during the year was 33*s.* 1*d.* per cwt.

From a synthetic aspect this is distinctly encouraging, as, by purchasing the whole of the imports for conversion into isoprene, an energetic chemist would be able to put no less than 3,000 tons of evil-smelling table-jelly on to the rubber market at a cost of a little over 2*s.* 6*d.* a lb for materials alone, without allowing for costs of manufacture, interest on capital, and any rise that might occur in the price of turpentine by the advent of so spirited a purchaser.

Even if he turns from turpentine to starch, the synthetic rubber man is confronted by a rise in the price of tapioca, due to the fact that large areas formerly dovoted to tapioca planting are now being planted to rubber, a crop the prices of which will probably remain as high as at present for at least two years, and may possibly advance. Little tapioca planting is being done, and it is not likely that any will take place until either the price of rubber falls or that of tapioca becomes so high as to make its culture more profitable than that of rubber. The only thing really left to the chemist it seems to us, is rubber itself. He might buy lantation crepe, and, so to speak, "shatter it to bits" and build it up again nearer to his heart's desire. The product no doubt could be used as a boot polish, or a hair restorer, or both.—*Rubber World.*

Messrs. Geo. White & Co., say the following notice has been circulated and will be of interest to agents and planters:—

"Owing to the large increase in the imports of over-smoked sheet rubber, the Standard Qualities Committee wish to point out that such over-smoked rubber will not be regarded as standard quality."—*The Rubber World.*

MOTTO FOR 1913.

Get out your Venèsta cases "We still hear complaints of rough cases being used," write Messrs. Gow, Wilson in their 1912 "Annual Rubber Report." The insides of the packages must be well planed and smooth, so that the rubber shall arrive free from saw-dust, chips of wood, &c. Care must be taken to see that both cases and rubber are thoroughly dry before packing.—*Tropical Life.*

The Planters' Chronicle.

RECOGNISED AS THE OFFICIAL ORGAN OF THE U. P. A. S. I., INCORPORATED.

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THE U. P. A. S. I.

(INCORPORATED.)

Contents.

We would beg to remind readers that the registered address of the Secretary of the United Planters' Association is "Planting" and that the use of this by those who have occasion to wire to him will save many annas in the course of the year.

Mr Anstead, Planting Expert, is expected to return to Head Quarters on Monday next, 16th instant.

The Proceedings of the West Coast Planters' Association are printed, also those of the North Mysore Planters' Association.

It is to be hoped that Sprayers have also been ordered for the Insecticides for without them the latter will not be of much use. It will be like Hamlet with the part of Hamlet left out.

The Experimental Research Record of the United States Agricultural Department supplies us with an article on "The way it is done in America" which shows how far ahead they are to anything in the Empire though the latter are slowly awakening to the fact that without scientific aid and guidance, not much progress is to be made.

But for the mistake made at Kew the Tea Industry would be twenty years ahead of what it is at present, and the article on "The Indian Tea Industry" is interesting reading and reads as the writer says, more as a romance than as a dry history of fact.

On application to these offices a Bulletin on the "Labour Question" can be procured. It consists of cuttings from various papers dealing with this important question and not only shows how difficult is the solution of it, but it also shows that the minds of many men in many countries are considering the best way to settle it.

The Annual Meeting of the U. P. A. S. I. will probably be held on August 25th and an Exhibition of Products at the same time.

DISTRICT PLANTERS' ASSOCIATIONS.

West Coast Planters' Association.

Proceedings of a General Meeting held at Palapilly, Cochin, on the 3rd June, 1913.

PRESENT.—Central Malabar Syndicate per, Mr. V. L. Travers Drapes,
Mooply Valley Rubber Co. „ Mr. E. H, Halliley.
Mysore Rubber Syndicate „ Mr. C. W, Clode.
Pudukad Rubber Co. „ Mr. H. C. Plowden,
Pullangode Rubber Estate „ Mr, H. Waddington, Hon. Secy.

Visitors.—Messrs. T. B. Ashworth, R. T. Bowles, T. Dixon, J. A. Ellis, E. S. Halliley, C. L. McLean and H. J. Walmesley.

Chairman.—In the absence of Mr. Hunt, Mr. C. W. Clode was voted to the Chair.

The Proceedings of last Meeting, inclusive of Rules passed thereat, were confirmed.

Statement by Honorary Secretary.—Recorded. He was asked to print the same with the Proceedings.

The last meeting of the Association was held at Calicut on the 25th January, at which the Annual Report and Accounts made up to 31st December, 1912 were submitted.

I took over the Secretaryship from Mr. Plowden, but owing to papers and books going astray on the Railway, there was considerable delay in publishing and sending copies of the Proceedings to members. These, however, were sent out on the 2nd March and were followed shortly afterwards by copies of New Rules and Accounts.

Of the Rules I have only to explain, that after full enquiry and learning there was no other Association with a similar title, I adopted the new name of the Association, as approved at the last Meeting.

From copies of Accounts, circulated, you will have seen we closed last year with an apparent balance of Rs.190-7-10. After due consideration for reasons given below, the Committee decided to write off as irrecoverable the amounts shown in that account as due by Mr. P. L. Joseph and members Rs.35. The amount due by Joseph appears to be a balance of a sum of Rs.60 advanced to a clerk on 21st October, 1911. Owing to legal difficulties it is not considered worth while to take a civil suit, but I trust if any member of this Association employ the man, they will recover the amount for us. The amount due by members was Rs.10 each, shown as due by Messrs. Kirk and Horsfall. A letter exists in the file showing Mr. Kirk tendered his resignation on the 5th January 1912 and we do not think, therefore, that he should be expected to pay subscription for that year. Similarly, although we are unable to trace any letter, we accept Mr. Horsfall's claim that he resigned at the same time, the letter may have been lost after receipt. The actual balance we closed the year with was accordingly, Rs.155-7-10, but this result was only attained owing to refund of Rs.331-10-8 received from the Rubber Exhibition Fund, an item of income we shall not receive in future. The financial position was not, therefore, really sound, and in order to make it so, although they contemplated increased area coming in, and that with formation of branches, expenditure of this Association would not be as much as in previous years, your Committee decided to levy assessment at same rate as last year, namely 1½ annas per cultivated acre. From the Accounts, made up to 31st May, laid on the table, you will see that we are now, as far as can be foreseen, in a fairly sound position. When all subscriptions are paid up, we should have Rs.1,147 to meet the expenditure of the last seven months of the year, which is estimated at Rs.700.

Since the date of our last meeting, the Eddivanna Rubber and Tea Company have joined the Association, and although our figures are not quite complete, as there are still two Estates in arrears with subscription and declaration as to present cultivated area, the acreage represented by this Association is about 13,215 acres under Rubber. I trust this will be increased to 15,000 before the end of the year.

As instructed at last meeting, I forwarded our subscription to Lady Ampthill Nurses' Institute, and all members of the Association are entitled to benefits thereof. I am asked to furnish a complete list of members, but have been unable to do so yet, as all estates have not made the return for which I asked, as to names of Assistants employed.

On the 15th March, a Cochin Branch Association was formed with a starting membership of 14, and I will ask you later to confirm acceptance of this as a recognised affiliated Association.

We were asked if we wished to bring any special matter before the Tea Cess Committee, a meeting of which was held on the 14th March, but whether our representative attended or not, I have not been informed. Our opinion was asked as to whether, if an Indian Gold Coin were introduced, it should be of the value of Rs10 or Rs.15, to which I replied with the consent of the Committee, that we considered Rs.10 the more suitable as likely to work in with a decimal system. We are asked to advise the Acting Chief Secretary to Government names of any gentlemen wishing to appear before, and give evidence to, the Indian Finance and Currency Commission. The Deputy Inspector-General of Police advocates detail descriptive marks of Maistries and coolies being recorded, and a copy of such record being sent with all warrants.

To avoid repetition I have refrained from mentioning other matters which have come before the Association during the last five months, as they appear in the Agenda for this Meeting and can be explained and discussed in due course.

Owing to the great distances at which we are situated, the Committee have been unable to hold any actual Meetings, but I have been in close touch and constant communication with the Chairman. I was able to visit Mr. Plowden on his return from Australia, and by means of circular letters I have kept the members of the Committee informed of what business was in hand and received their instructions. I trust under the difficulty of the circumstances, they have found the arrangement satisfactory.

(Signed) H, WADDINGTON.
Honorary Secretary.

Cochin Branch.—This under the title of the "Cochin Planters' Association" was accepted as an affiliated Association and recognised Branch.

Having incurred certain expenditure on stationery and rubber stamps under the title of "West Coast Planters' Association—Cochin Branch," the Honorary Secretary was instructed to pay them any expenses incurred owing to change of title.

Membership.—It was explained that of the 29 Private members shown in previous reports, only 17 appear to have ever paid any subscription, of these 4 have resigned. Resolved:—"That only the names of those gentlemen who have paid subscriptions in 1912 shall be retained on the records as "Private Members.""

It was considered that it was undesirable that managers of estates should also be entitled to private membership, all such members have expressed a wish to discontinue their dual membership, but as this involved alteration of Rules which cannot be done without notice, notice was given that at the next Meeting a proposition will be brought forward to insert the words :— " Not already having a vote as representative through an estate subscription" between the words " person " and " duly " in Rule I. The list of Honorary Members was confirmed, but from date Honorary Members will be recorded by name and not by office as heretofore."—Carried *nem con.*

Records.—Recorded that the Honorary Secretary had destroyed certain old papers, valueless for purpose of record. His action was confirmed. Recorded with regret the Honorary Secretary's report that the letter files prior to 1911 had been destroyed by white ants.

U. P. A. S. I.—Delegates Mr. Waddington and Mr. Hunt were elected as delegates to the Conference of U. P. A. S. I. at Bangalore next August, but if either is unable to go, it be left to the Committee to select others. Proposed by Mr. Plowden, seconded by Mr. Clode.—Carried.

Instructions to Delegates.—The delegates were instructed to promise subscription up to the same rate as at present for 1913-1914 to U. P. A. S. I. and Scientific Officer Fund. They are not to pledge this Association to any definite labour scheme or legislation. The delegates be allowed to use their own discretion with regard to continuation of Scientific Officer Scheme. Any further definite instructions will be given before the date of meeting by the Committee.

Southern Indian Planters' Benevolent Fund.—The Honorary Secretary called attention to the considerable falling off of support to this in recent years. Amount paid through Association was in 1910, Rs.230, in 1911, Rs.135, in 1912, Rs.70, promised so far in 1913, Rs.25. Subscription was promised by ten planters present.

Rubber Theft Act.—This matter comes before the Meeting at the suggestion of Mr. Hunt who wishes the matter again taken up and kept separate to the question of protection for tea, pepper and cardamoms. The Honorary Secretary was requested to ascertain if a Rubber Theft Act is in force in Travancore, and if so, to ask the Cochin Durbar if they will pass or have passed similar legislation *vide* Association Proceedings 6th May, 1911, and the delegates were asked to bring matter up at Bangalore.

Contracts between Maistry and Cooly.—Read correspondence between Mr. Hunt and the Magistrate at Manjeri, in which the Magistrate states that he doubts whether Act XIII is applicable to cases of contract between Maistries and coolies and refuses the issue of warrant on the complaint of a Maistry till he has referred to the Divisional Magistrate, Malapuram. Further letter from the Magistrate stating that the Divisional Magistrate has ordered that a Maistry or middle man is not entitled to take proceedings unless he is a person acting on behalf of his master or employer.

Read letter from the Honorary Secretary to the Divisional Magistrate, Malapuram, pointing out that the last ruling does not meet the question in dispute, as in the case under consideration the Maistry, not the Estate, is the employer. Resolved: That the matter be postponed till the next meeting when the Association can consider the reply to the Hony. Secretary's letter.

A cordial vote of thanks was passed to Mr. McLean for the use of his bungalow for the Meeting.

With a vote of thanks to the Chair, the meeting terminated.

(Signed) C. W. CLODE,
Chairman.
(„) H. WADDINGTON,
Hony. Secrearty.

North Mysore Planters' Association.

Proceedings of the Third Quarterly Meeting held at Balehonnur on June 3rd, 1913,

PRESENT.—Messrs. C. Danvers, R. G. Foster, E. H. Young, C. P. Reed, A. F. Evvets, F. W. Hight, Thos Hunt (President), and W. H. Read (Honorary Secretary.) Mr. J. Clifford (Visitor).

Madras Act No. I of 1903,—Proposed by Mr. C. Danvers and seconded by Mr. C. P. Reed: "That this Association is prepared to accept the Madras Planters' Labour Act No. I of 1903. provided extradition goes with it, and that the Mysore Government adopt certain modifications to suit local requirements. Such modifications to be drawn up in consultation with the "Council of Mysore Planting Association."—Carried unanimously.

Green Bug.—This subject was discussed, and it was decided that every member be asked to lay in a stock of Insecticide (soap, soda and rosin) so as to be prepared should the pest appear in N. Mysore.

Delegate to U. P. A. S. I.—Mr. Hunt was elected to represent this Association.

A vote of thanks to the Chair closed the meeting.

(Signed) W, H. REED,
Hony. Secretary.

INDIA-RUBBER ; GUTTA-PERCHA.

Plantation Rubber in 1912. W. Freudenberg. Gummi. Zeit., 1913, 27, 1005-1006.

The imports of raw rubber into England in 1910, 1911, and 1912 were 43,849, 45,298 and 55,023 tons respectively. The exports were 23,394, 28,562 and 36,298 tons, being respectively 53, 63 and 66 per cent. in weight, and 57, 73, and 76 per cent. in value, of the imports. The price did not vary much in 1912. In the beginning of the year fine hard Pará was 4*s*. 4*d*. per lb. and plantation rubber, 4*s*. 10*d*.; at the end of the year the prices were 4*s*. 5*d*. and 4*s*. 4*d*. The highest prices were 5*s*. 1*d*. and 5*s*. 6*d*.; the lowest were 4*s*. 3*d*. and 4*s*. The consumption for 1911-12 was, according to Hecht, Levis and Kahn, 99,564 tons, an increase of 25,482 tons above 1910-1911. Up to 1910 the average increase was only 5 per cent. per year. The supply for 1911-1912 is estimated as 93,669 tons against 79,305 tons in 1910-1911; visible supply on 30th June, 1912, 10,181 tons against 12,563 in 1911. Grisar and Co., and others, estimate the consumption as 103.000 tons, and supply 93,000 tons. S. Figgis and Co., estimate supply and consumption for 1912 as 99,000 tons. The total export of the Malay Peninsula for 1912 was 22,353 tons against 11,490 in 1911. The total from Ceylon was 6,700 tons against 3,200 tons in 1911; about 55 per cent. of the export from Ceylon reached London. The export from S. India was 125 tons against 42 in 1911. The area planted with rubber is estimated at about 1,085,000 acres (Malaya 430,000, Ceylon 230,000). The amount of rubber expected in 1913 is 50,000 tons plantation and 65,000 wild, 115,000 tons in all (the wild rubber has about 20 per cent. more moisture).—H. E. E. P.—*Journal of the Society of Chemical Industry.*

THE WAY IT IS DONE IN AMERICA.

The following account of the development of the United States Agricultural Department and the record grant allotted to it for 1913-14 is extracted from the *Experiment Station Record* for March.

The Act making appropriations for the support of the Department of Agriculture for the fiscal year ending June 30, 1914, considerably enlarges the powers and duties of the Department, provides for the maintenance and development of most of the present lines of work, and establishes a new high-water mark for the funds at its disposal. The total amount carried by the Act is $17,986,945, an increase of $1,335,449, or about eight per cent. over that of the present year and $1,086,929 in excess of that for the fiscal year of 1912, which had been the highest in the history of the Department. Many of the increased allotments are designed to provide for additional administrative and police duties and the extension of the demonstration work, but opportunity is also afforded each bureau for some development of its lines of research as well. The outcome as a whole may be regarded as both significant and encouraging, indicating a sustained public interest in the work of the Department and an increased recognition of the profits, accruing to the country from the consistent and uninterrupted fostering of its agricultural development.

In its general form the law conforms closely to its immediate predecessor, but in addition to the provisions of a routine nature it contains considerable new legislation. In fact, it embodies practically all of the agricultural legislation enacted at the closing session of the Sixty-second Congress. Some of the principal matters which are included are the authorization of the appointment of a Commission to investigate the subject of rural credit, a federal law for the protection of migratory game and insectivorous birds, and the regulation of commerce in serum, virus, etc., for the protection of domestic animals.

Widespread interest is now being manifested in the subject of increasing agricultural credit facilities. This interest found expression in a clause authorising the President to appoint a Commission of seven persons to cooperate with a Commission, already designated by the Southern Commercial Congress, in a study in Europe of co-operative land mortgage banks, co-operative rural credit unions, and similar organizations. This Commission is to serve without compensation, but is allowed $25,000 for the employment of assistants and other expenses.

Another important measure to be incorporated in the Act is the so-called "McLean Bird Protection Bill." Under its provisions all wild geese, wild swans, brant, wild ducks, snipe, plover, woodcock, rail, wild pigeons, and all other migratory game and insectivorous birds which do not remain entire year within any one State, are declared to be the property of the the United States Government and their capture or destruction is prohibited except under regulations to be promulgated by the Department with the approval of the President. The Department is authorised to prescribe closed seasons for these species, within which reasons violations may be punished by a fine not to exceed $100, imprisonment for not over ninety days, or both. An appropriation of $10.000 is made for the enforcement of these provisions, under the administration of the Bureau of Biological Survey.

In order to prevent future dissemination of dangerous diseases conveyed by contaminated materials, interstate commerce in virous, serum, toxins, or analogous products for the treatment of animal diseases is restricted after July 1 to products manufactured in domestic establishments licensed by the Secretary of Agriculture, or imported from foreign countries under a permit from him. The Department is authorised to make all necessary inspections and to promulgate rules and regulations, and is granted an initial appropriation of $25,000 for its enforcement.

Nearly all of the regulatory or police functions hitherto placed upon the Department receive increased support. Thus $200,000 additional is granted to supplement the Meat Inspection Act of 1096, which carries a permanent appropriation of $3,000,000 per annum, and the allotment for the enforcement of the Food and Drugs Act is increased from $625,000 to $675,000. The maintenance of the plant quarantine is provided for with an appropriation of $40,060, $10.000 of which is immediately available, and the act is amended to permit of importations from quaranticed countries by the Department itself for experimental or scientific purposes. Small increases are also granted for the enforcement of the Insecticide Act, making $95,000 available for this purpose, and for the seed inspection, the scope of which is extended to include lawn grass seed.

As usual, there is considerable new legislation relative to forestry matters. The action of the previous year increasing to 35 per cent. the portion of the receipts from the National Forests to be expended locally for public schools and roads is made permanent law. Co-operation with the States under the Appalachian Forest Reserve Act of 1911 is continued with an appropriation of $75,000, in addition to any unused balances heretofore granted, and the Act itself is amended to permit of the acquisition of lands encumbered by rights of way or other reservaticns not interfering with the use to which the lands would be put.

Further impetus is given to the work of segregating lands within the National Forests that may be open to entry under the homestead laws by increasing to $100,000 the funds available for their selection. Of this amount $35,000, together with any unexpended balance from the preceding year, is to be used for the survey and listing by Forest Service employees of these lands which are chiefly valuable for agriculture. In addition, the Bureau of Soils receives $20,000 for similar work in co-operation with the Forest Service, and $25,000 is granted to effect exchanges of lands and indemnity rights with the State of Montana, which is required to contribute an equal sum.

Great interest was again manifested by Congress in the Department's demonstration and extension work. An increase of $75,000 is granted for the farm management and demonstration work, making $375,000 available for the purpose, and an equal sum is provided for the co-operative demonstration work in the South. The campaign for the eradication of the cattle tick is stimulated by an increase from $50,000 to $325,000, with the proviso that none of this may be used for the construction of dipping vats or the purchase of dipping materials except for experimental or demonstration work by employees of the Bureau of the Animal Industry. An allotment of $75,000 is made for demonstrations of the best method of combating hog cholera, and the gipsy moth campaign will receive $300,000 as compared with $284,840 at the present time.

Of the new lines of investigations which were authorized, the most important is that of marketing systems. It will be recalled that the previous Act directed the Secretary to collect information relative to co-operative and other systems of marketing farm products in vogue in this country, and to make recommendations as to any further investigations of these and related questions. A comprehensive report was accordingly prepared by the Bureau of Statistics summarising existing systems and advocating the establishment of a division of markets within the Department. This division was not definitely established, but investigations were authorised under an appropriation of $50,000, of which $10,000 is immediately available, to enable the Secretary to acquire and disseminate "useful information on subjects connected with the marketing and distributing of farm-products." He is also authorized to continue the studies under way for several years on the cost of food supplies at the farm and to the consumer.

Other new investigations for which specific appropriations are made include $2,500 for experiments in feeding and breeding ostriches, $10,000 for testing the waste, tenfile strength, and bleaching qualities of the various standard grades of cotton, and $30,000 for a study of corn improvement. Authority is also given for studies of insecticides and insecticide machinery.

The complete story of this remarkable epoch in our agriculture cannot here be attempted, but a summary by Dr. E. F. Smith, of the Bureau of Plant Industry, speaking as the representative of the Department at a farewell reception tendered by the employees to the retiring Secretary, may well be quoted :—

"In that sixteen years we have grown from less than twenty-five hundred persons occupied with problems for the betterment of agriculture to nearly fourteen thousand workers. We then expended less than three million dollars per annum on our work. The Bill that has recently passed Congress directs to expend nearly eighteen millions. Sixteen years ago we had very little influence at home and none abroad. To-day there is not a civilised country in the world that does not speak with respect and envy of our Department of Agriculture, and as for our standing at home, one has only to ask any well-educated farmer anywhere in this broad country."

FEDERATED MALAY STATES.

RUBBER EXPORTS DURING JANUARY-MARCH, 1913.

The following figures of the exports of cultivated rubber from the Federated Malay States during the first quarter of 1913 have been furnished by the Commissioner of Trade and Customs at Kuala Lumpur, the corresponding figures for 1912 being added for purposes of comparison :—

AGRICULTURAL AND FOREST PRODUCTS.

	1912 Lbs.	1913 Lbs.
January	2,730,576	4,772,880
February	2,715,767	3,936,529
March	3,089,558	3,891,619
Total for the Quarter ...	8,535,901	12,601,028

HAYTI.

COFFEE CROP PROSPECTS.

H. M. Charge d'Affaires at Port-au-Prince (Mr. J. Pyke) reports, under date 30th April, that the Coffee crop of Hayti shows great promise, and is expected to give a larger yield than that of 1911-12, which was more than 80,000,000 lbs.—*The Board of Trade Journal.*

TEA.

The Indian Tea Industry

It is difficult to realise that so recently as 1820 the tea plant was first discovered to be growing wild in Assam. On the plant being submitted for examination to the Director of Kew gardens, this gentleman declared it was not a true tea plant at all, and twenty years were consequently wasted before his erroneous verdict was successfully discredited. The Assam Tea Company was then formed, and by scientific cultivation of the native plant the shareholders of this concern have now reaped a sevenfold return on their capital. The wild tea plant of Assam was afterwards introduced into Ceylon with such good effect that the Ceylon planters have been able to excel the tea exports of the whole Chinese Republic, which held a monoply of the tea industry for over a thousand years. The way in which the British planter in India, Ceylon, Burma and the Shan States has won the supremacy over the export tea trade of China and Japan reads more as a romance than as a history of fact. Not only are they now doing more than double the export tea trade of China, but they are actually importing millions of pounds of Indian and Ceylon tea of poor quality into that country. Instead of the Japanese controlling practically the whole tea trade with the United States, as they did do up to quite a recent date, they are now virtually giving up the struggle against the rivalry of Indian and Ceylon teas, and with the exception of a special tea noted for its peculiar flavour which is grown in Formosa, India and Ceylon are producing teas of every practical variety. China cannot excel the choice tea grown on the Indian hills, and the blends of cheap, pure leaf produced on the plantations of Ceylon are unrivalled.

To what is this amazing agricultural victory due? We can write down three factors, *viz.*, modern science, personal enterprise, and modern power machinery. British botanists provided our planters with a stronger and more productive shrub than the highly cultivated plant of China. Not only is the leaf twice as large, but the plant produces two crops to the Chinese plant's one. And finally the botanists have taught the Indian planter how to cultivate the wild plant to the best advantage. With this great start the planter became a man of enterprise. The next call was made upon the engineer to devise power machinery for dealing with the tea leaves that the natives picked for him. As in all other industries this is a matter of peculiar difficulty in a country where hand labour is both abundant and cheap. But the British tea planter aimed at something which even cheap manual work could not accomplish. His article had to be exceptionally clean, and where the utmost markets were to be won he had to be able to turn out large quantities with clock-like regularity and always with identical qualities. These requirements spelt machinery. He knew all the weak spots in his Chinese rival's armour, and determined to avoid them in his own. The mal-practices of the Chinese, such as treating the leaves with gypsum and Prussian blue in order to increase their colour and brilliance, also enhanced the prestige of the cleanly and scientifically prepared teas of India and Ceylon, and in about twenty years, from 1885 on, the exports of Chinese tea fell off nearly 50 per cent., while those of India, Burma and Ceylon have gone on steadily rising, and now total close on 500 millions pounds per annum. So excellently have the scientific methods and laborious enterprise of the Anglo-Indian tea industry been organised that to-day there is a common fund for advertising and other purposes, and a Council for planning campaigns of defence and offence and for the promotion of interests generally. In India alone there are about half a million acres of tea plantations. These are for the greater part situated in Eastern Bengal and Assam. The Assam teas have become so famous that the Chinese actually label their own produce as Assam Pekoe Souchong. In Ceylon there are just under four hundred thousand acres of land planted with the tea shrub. The average size of an estate is about three hundred acres. The most modern tendency is, however, to group several plantations under one working staff, in order to reduce the expenses of working management. A large number of comparatively small estates are directed by British planters resident on the land, but very often the planter is now merely a servant of a company, and not, as he often used to be, the actual owner of the estate. Something like half a million coolies are employed on the Ceylon plantations. Whole families of men,, women and children are recruited from their villages in Southern India and transported to Ceylon, and in the main these people are good workers, and from their standard receive good wages.

A new tea garden is first opened out by clearing, hoeing and trenching a piece of jungle. This forms a nursery. The ground has to be carefully fenced against the ravages of cattle and wild animals, and is then planted with seed, which has been sprouted in seed beds. Next it is thatched over to protect it from the scorching sun. Meanwhile the site of the future plantation has been cleared and hoed and roads and drains made through it. The rows in which the young tree plants are to be grown are staked out about four feet apart. The plants, when about a foot high, are carefully transplanted from the nursery in the rows of holes prepared for them. The planter has now to sit tight for three years before he will receive any return on the young plantation. All this time incessant labour will be required to keep down the vigorous tropical weeds which will assail his property. At the end of three years his plants will send out an abundance of young leaf shoots known as flush. The plucking will then be carried out at regular intervals, and the bushes will be pruned from time to time to keep them within bounds and to strengthen the growth of the flushes. In the colder climate of China and Japan the flushing ceases in the winter. but the hot, stagnant, steaming heat of the jungle causes the Ceylon plants to continue flushing throughout the year, and pickings are made every ten or twelve days. Upon the size of the leaf when picked depends the quality of the tea. In fine plucking the bud at the top of the shoot and the two young leaves just below it are taken. In medium plucking three leaves are taken with the bud. In coarse plucking four leaves and the bud are gathered. The teas made from the fine plucking are classed as Pekoes. The youngest leaves are classed Flowery Pekoe, the second leaf Orange Pekoe and the third Pekoe. From the larger leaves Souchongs and Congous are prepared, and there is also a mixture of young and old leaves which is known as Pekoe-Souchong. The beverage made from the youngest leaves is particularly fine and wholesome, and a less quantity of this tea is required to give the desired strength. After the leaves are gathered into baskets by women they are taken to the factory, and the flush is weighed. It is then thinly spread out on shelves of canvas or wire mesh, placed one above the other, where the leaf naturally withers in good weather in about eighteen hours. The withered leaves are then shot into rolling machines, where they are bruised to allow their juices to become mixed, and they are also curled or twisted. From the rolling machine the tea falls in yellow, clinging masses into a roll breaker, that breaks up the masses and drops the tea into a sifter, where the coarser leaves are separated from the younger, finer growth. Next comes the important process of fermentation, on the success of which largely depends the quality and character of the tea. Green tea, which was formerly so popular, was manufactured by omitting the fermentation process, but all black teas must be fermented. This is done by putting the rolled leaf into drawers or on mats, which are placed one above the other so as to permit the air to freely enter and work on the bruised leaves. During fermentation the leaves emit a peculiar odour and change colour. In about two hours they attain a certain copper-brown tint, and are then fired into the drying machines, where all other fermentation is arrested by the heat. Besides checking fermentation, the firing process also removes the moisture without drying off the essential oil and other constituents that give a tea most of its value. There are many types of firing machines, but they all act by sending a current of hot dry air through the damp, fermented leaf, and make it dry and brittle After the tea has been fired it is taken to the sorting room and sifted by a machine through a series of moving sieves of varying sizes of mesh. The siftings are classed as Flowery Orange Pekoe, Orange Pekoe and Pekoe No. 1. These are unbroken teas. The coarser leaves, which do not shoot through the meshes, are transferred to breaking machines, and are broken up and then passed through the sieves. They form the products known as Broken Orange Pekoe, Pekoe No. 2, and so on.—*The Indian Planters' Gazette and Sporting News.*

FRENCH COLONIES AND PROTECTORATES.

MEASURES TO PREVENT THE INTRODUCTION OF PLANT DISEASES.

The French "Journal Officiel" for the 14th May contains a Presidential Decree, dated 6th May, which provides that, with a view to preventing the propagation of plant diseases caused by animal or vegetable parasites or by non-parasitic worms or insects, the Minister for the Colonies may, by Decrees, which shall indicate the disease and the plants that may be attacked thereby, prohibit the importation into the French Colonies and Protectorates, other than Algeria, Tunis and Morocco, of (1) plants liable to the disease, (2) all other plants with which the disease may be carried, (3) earth and composts that may contain the parasites or non-parasitic worms and insects at any stage of their development. At the same time, the importation of boxes, bags and packings which have served for the transport of prohibited plants, &c., may be forbidden.

In default of prohibition, the Minister may, by Decree, lay down special conditions to which the importation of plants, &c., shall be subject; and he may also regulate the importation of branches, leaves, fruits, seeds, and waste of prohibited plants.

CEYLON.

RUBBER EXPORTS.

The following statistics of the exports of rubber of domestic production from Ceylon during the month of February and the two months ended February, 1912 and 1913, have been extracted from official returns issued by the Ceylon Government:—

To	Feb. 1912. Lbs.	Feb. 1913. Lbs.	Jan-Feb. 1912. Lbs.	Jan-Feb., 1913. Lbs.
United Kingdom ...	805,204	1,016,603	1,386,219	2,123,162
United States ...	574,394	1,301,192	816,553	1,693,660
Other Countries ...	273,080	257,601	429,870	516,515
Total Exports of rubber of domestic production ...	1,652,678	2,575,396	2,632,642	4,333,337

The Board of Trade Journal.

RUBBER.

Federated Malay States.

EXPORTS OF RUBBER IN 1912 AND IN JANUARY 1913: CORRECTION.

With reference to the notice on p. 464 of the "Board of Trade Journal" of 20th February last relative to the exports of cultivated rubber from the Federated Malay States in 1912, it is notified by the Commissioner of Trade and Customs at Kuala Lumpur that the total amount of rubber exported from the States in that year was 34,732,415 lbs. and not 34,718,015 lbs., as previously estimated. The difference of 14,400 lbs. has gone to the credit of Perak, the exports from that State being given as 10,486,689 lbs., instead of 10,470,289 lbs. This amount of 14,400 lbs., however, was erroneously included in the figure given as the export of rubber from Perak in January, 1913 (see p. 685 of the "Board of Trade Journal" of 20th March) and should read 1,236,298 lbs., instead of 1,250,698 lbs., thus making the total amount exported from the States in that month 4,772,880 lbs.—*The Board of Trade Journal.*

Brazil, Peru. Bolivia.

EXPORTS OF RUBBER FROM THE AMAZON BASIN, *via* PARA.

H. M. Consul at Para (Mr. G. B. Michell) reports that the quantity of rubber exported from Pará, Manaos, Iquitos, and Itacoatiara during the month of March and the three months ended March, 1912 and 1913, was as follows:—

—	Fine. Kilogs.	Medium. Kilogs.	Coarse. Kilogs.	Caucho Kilogs.	Total. Kilogs.
March, 1912—					
To United States...	923,127	269,153	828,225	644,050	2,664,555
To Europe ...	1,114,992	169,486	317,312	619,521	2,221,158
Total ...	2,038,119	438,486	1,145,537	1.263,571	4,885,713
March, 1913—					
To United States...	774,920	119,531	601,034	298,531	1.794,016
To Europe ...	1,349,982	223,488	395,667	1,231,842	3,200,979
Total ...	2,124,902	343,019	996,701	1,530,373	4,994,995
1st Quarter, 1912—					
To United States...	2,836,148	687,022	2,041,416	1,112,458	6,677,044
To Europe ...	3,944,109	463,729	952,110	1,715,972	7,075,920
Total ...	6,780,257	1,150,751	2,993,526	2.828,430	13,752,964
1st Quarter 1913—					
To United States...	2,576,506	439,270	1,824,145	843,961	5,683,882
To Europe ...	4,076,557	711,053	864,381	2,793,177	8,445,168
Total ...	6,653,063	1,150,323	2,688,526	3,637,138	14,129,050

Kilog.=2·2046 lbs.

—*The Board of Trade Journal.*

The Planters' Chronicle.

RECOGNISED AS THE OFFICIAL ORGAN OF THE U. P. A. S. I., INCORPORATED.

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THE U. P. A. S. I.

(INCORPORATED.)

Contents

The registered telegraphic address of the Secretary of the United Planters' Association is "Planting."

A very interesting article is published by the Planting Expert, recording the impressions of his recent visit to Coorg to inspect some of those estates that are infected with Green Bug. He has, we believe, solved the question as to how the pest has been brought into Mysore and Coorg, and it must be a source of congratulation to all and especially to Messrs. Stanes and Co., that the erroneous idea that it was brought into the Coffee planting Districts on manure bags from their works has been laid to rest. Incorporated in the Planting Expert's article are some letters which should be read, as they entirely absolve Messrs. Stanes and Co., and should restore confidence. The whole article is especially interesting at this time. With the monsoon on us, helping to check the pest, breathing time will be given to planters to prepare for the fray afterwards. We trust that all will co-operate in the good work and follow the advice given by Mr. Anstead.

A very interesting letter from Mr. Brown dealing with the same subject is published, giving the prescription and method of making it, as used by himself with success. What one man can do, all can do.

We publish from the *Ceylon Department of Agriculture Bulletin*, by Mr. R. H. Lyne, a remarkable description of some yields of some Henaratgoda Hevea Rubber Trees. One puts down the paper, after careful perusal, convinced that the best way to attain the greatest yield is greater distance of planting apart.

It has been definitely decided that the Annual Meeting will take place on August 25th, 1913.

Scientific Officer's Papers.

CXVIII.—GREEN BUG IN MYSORE AND COORG.

I have recently paid a visit to Coorg and inspected some of the estates there infected with Green Bug (*Lecanium viride*). The infection appears to be scattered over a wider area in Coorg than in Mysore, and though the present attack is quite a light one, the matter is very serious and calls for co-operative action among the planters. This has been fully recognised in Mysore, and as already reported in the *Chronicle*, a combined meeting was held at Chickmaglur on 20 May to discuss the situation. At this meeting several important resolutions were passed. The first asked for the aid of the Mysore Government in endeavouring to locate the source of infection. This is a very important matter, since could the source of infection be discovered, it would largely influence the measures of control which must be adopted. In all probability this source has already been discovered, but before dealing with that it is necessary to discuss a rumour which was at one time current, and which I believe is still current in Coorg, that the pest was introduced in manure. As I pointed out some weeks ago I do not consider this at all likely, but still one particular Firm has been picked out because of the proximity of their works to the Nilgiris and their extensive dealings with that district, and more or less accused of sending manures to Mysore and Coorg planting districts in bags infected with Green Bug.

Now I hold no brief for any Firm, but I feel very strongly that it is very unjust to connect the name of any particular Firm with such a theory until it has been proved, and it is only fair to Messrs. Stanes & Co. to repeat that they assure me that they take every precaution not to send out bags received from the Nilgiris, and that their coffee curing works and manure works are quite separate. I have much pleasure in publishing the following correspondence received from Messrs. Stanes & Co. for the purpose, and I trust that until more is definitely known about the source of infection no more will be heard of the manure bag theory of importation in close connection with this Firm. The correspondence referred to is as follows:—

Messrs. Stanes & Co., to the Editor of the *Planters' Chroncle*.

" As we have received enquiries from several of our constituents in Mysore and Coorg in reference to the rumour afloat in those Districts that the Green Bug had been introduced through our manure bags, we beg the courtesy of your columns for the publication of the following two letters sent in reply to our letters to those gentlemen on the subject.

" Although Mr. Scholfield at first put down the outbreak on his estate to our manure bags, he was afterwards convinced that he had been led to a wrong conclusion on insufficient data, and we are much obliged to him for the handsome way in which he retracts his previous statement.

" We also heard that the Manager of Ubban estate had given it as his opinion that the bug on his estate also had been introduced through our bags. As we had not supplied this estate with manure for many years now, we wrote to the Manager referring to the report in question, and asked him kindly to inform us on what grounds he attributed the infection to our bags. Nothing can be more satisfactory than Mr. Rutherford's reply.

" As far as we are aware Lingapur is the only infected estate that has had manure from us of recent years, and Mr. Scholfield's letter effectually disposes of the baseless theory.

"What we cannot understand is that our Firm should be singled out as the one through which the pest was introduced. Surely our proximity to the Nilgiris is not a sufficient cause, and besides we are not the only manure suppliers here, nor are we the only Firm that have dealings with Nilgiri Planters. We can only repeat in conclusion what we have already stated in your columns through Mr. Anstead, *viz.*, that our Manure Works are a mile distant from our Coffee Curing Works, that these two Factories have no connection with each other, and not a single crop bag has been used for packing manure in.

"We trust that this communication will satisfy all our Mysore and Coorg friends that whatever might be the source from which the pest was introduced, it was most certainly not through our manure supplies.

"Thanking you in anticipation for the courtesy of your columns for this rather lengthy communication,".

The Manager of Lingapur Estate, Saklespur to Messrs. Stanes & Co.,

"I thank you for your letter of the 24th instant in reference to the extract Mr. Irwin Durham read to you from a letter I had to written him, in regard to the outbreak of "Bug" on this estate, and to my conclusion that it had been imported with the manure he sent me. .

"From what you now inform me, I am quite ready to believe that it is quite impossible for the bags to have been infected at your works, but I think it might be possible for infection to take place while bags were in transit, either on the Railway or else during cartage up the ghaut. Mr. Durham no doubt will have given you full details of the outbreak here, and how everything pointed to the manure; there is still no signs of the pest on any of my remaining fields.

"Mr. Durham kindly sent me a list of a dozen estates or more to which he supplied manure at the same time as he did to me, and as none of these estates report bug, this is sufficient to prove to me that the pest could not have been imported from your works. The Cooly theory is quite out of the question in my case, as I employed no new coolies during the last 12 months.

"I shall be very pleased to show your letter to any of my friends who may bring the point of importation up."

The Manager of Ubban estate, Saklespur to Messrs. Stanes and Co.

"I am in receipt of your letter of 2nd instant to Mr. J. G. H. Crawford and as that gentleman has been in England since March, and an outbreak of "Green Bug" on this estate was not noticed till after he left, I conclude your letter refers to me.

"I note you are informed that "I have expressed an opinion that Green Bug was introduced on this estate through the medium of bags containing manure supplied by your Firm."

"I have expressed no such opinion, which would have been absurd, as this estate has had none of your manure for several years. I would take it as a favour, if you would kindly ask your informant on what he bases his statement, as I think he owes me an apology."

Now as to the probable source of infection. This has been pretty well worked out as far as Mysore is concerned, though it cannot as yet be *absolutely proved*. In the first place it was found that the native gourds grown in every village and in the lines on the actual estates have been recently infected with a scale which the coolies recognise as Green Bug and which they declare is the same as that now on the coffee, "which master is making so much fuss about," They are almost certainly right for they appear to know this scale quite well. These gourds in the lines have been cut down and thrown on the manure heaps and this manure has naturally been put into the coffee and it is most noticeable that in many cases the attack of scale on the coffee is worst near the lines.

The next link in the chain of evidence is that on one estate the manager, who was short of regular labour at the time of the outbreak, employed open country coolies to deal with it and they recognised the scale and said that they had for the last few years seen this pest on their crops such as beans, peas, and millet. Of course the cooly is not always to be relied upon in these matters and they may have mistaken the Green Bug for another scale, but I do not consider this very likely. Granted that this evidence is true. there is little doubt that the pest did reach these estates on the manure bags for in nearly all cases where there has been an outbreak of the bug in Mysore, the manure was carted from the railway station in the months of August. September, and October when the cartmen always carry green fodder for their bullocks. If this green fodder was covered with Green Bug it would infect the bags and they would arrive on the estate infected. Hence in all probability in this instance the *pest was imported on the manure bags but not from the manure works as was erroneously supposed.*

This is still a theory at present and needs proof, but the planter who sends me the information says that he is personally satisfied that the infection has come into Mysore from the open country and it is more than likely that it came in in the way suggested above. I quite agree with this and indeed it is what I suspected all along.

As regards Coorg it is not so easy to trace the source of infection since much of the manure comes in from the coast side through country where green fodder cannot be obtained, but still Mysore carts are used to a certain extent. In view of what has probably happened in Mysore it is only reasonable at present to suppose that infection has taken place in Coorg in much the same way.

It is very noticeable in Coorg that the places which are badly infected are in the neighbourhood of the lines and along roads where manure was put down from the carts. If the bags and carts were infected this is only what one would expect, while the coolies applying the manure would carry it on their clothes to the lines. There is little doubt that the bags and carts were infected, the point is where did they pick up the infection and the answer to that question is I feel sure, 'in the low country from infected fodder."

In this connection I would warn planters who are dealing with Green Bug that they should not let the gang working on it go back to their lines after their work is finished through clean coffee, but take them along open roads to their lines and as far as possible keep them out of the coffee. The smoke and heat of the lines, especially in the monsoon, will disinfect their clothes to a great extent. It is true that after being dismissed at the lines some of them may go back in to the coffee for firewood, etc., but the infection is so easily carried and the matter is so important that I suggest that it might be worth while to have fire wood collected for the lines by special gangs while the pest is being dealt with.

With regard to the first resolution passed at the Mysore meeting we need the aid of the Mysore Government to enable us to thrash out the theory of infection outlined above and prove its truth or falsity.

The second resolution asked for the appointment of an Inspector for Estates not belonging to the district Planters' Associations. This appears to be a good move and probably the Mysore Agricultural Department will be able to help in the matter. In Coorg a pamphlet is being issued, and widely distributed, describing in simple language in English and Canarese, with the aid of a few drawings, the appearance of the scale and asking anyone who finds it to report it at once to the Commissioner, the Hony. Secretary of the Coorg Planters' Association, or the Scientific Assistant. This might well be done in Mysore also.

The third resolution passed at the meeting asks for some form of local Pest Act. I have always preached the necessity of Pest Acts and have written a good deal on the subject at one time or another, but the real drawback to such Acts is the difficulty of enforcing them.

In Coorg a Regulation is under discussion to make provision for the eradication of noxious weeds, and it would appear that a very similar Regulation might be passed for the eradication of noxious pests like Green Bug. The Regulation provides that the term 'noxious weed' includes Lantana, and any other plant, which, the Chief Commissioner may from time to time by notification, declare to be a 'noxious weed,' and that every landholder shall eradicate and effectualy destroy all noxious weeds growing, or being grown, upon the land comprised in his holding. The Commissioner, or any other officer specially empowered in this behalf by the Chief Commissioner, on finding any noxious weed on any holding, may issue notice to the holder thereof directing him to remove and effectually destroy such weed and to keep his holding entirely clear of it. In fixing the period within which the weed shall be eradicated and destroyed the officer issuing the notice shall have regard to the extent of the holding, the nature of the growth of the weed, and the pecuniary means of the holder. If any holder on whom such a notice has been served fails to comply therewith, he can be fined up to Rs.50 and if he still fails to obey the order the officer may send and destroy the weed for him and recover the cost of so doing as arrears of revenue.

The object of this Regulation is to eradicate Lantana which has been proved to "destroy grazing, encroach upon cultivation, render village sites and adjoining habitations unhealthy, harbour wild animals and insect life that seriously damage crops, and is very liable to fire which by reason of exceptional fierceness destroys tree growth and prevents reproduction." The necessity of staying the inroads of Lantana has long been recognised and various means were ineffectually adopted. "Early in 1906 a general campaign against Lantana was initiated based upon official persuasion and advice and backed up by offers of more extensive remission of assessment. Much official energy was expended on the movement which received considerable support from the ryots and it became clear that the desire to rid the country of Lantana was general, but that something more than persuasion is needed to induce the ryots to make the effort which they themselves admit to be so much in their own interest."

"The effects of persuasion and advice are waning, the industrious ryots have done their share, but their lands are in danger of reinfection through the neglect of their neighbours. Hence the necessity for legislation."

I have quoted this proposed Regulation at length because it appears to apply equally well to a pest like Green Bug, which if it becomes established will do far more harm than ever Lantana is capable of, and if the Regulation is passed it would appear to provide a reasonable precedent for a similar Regulation to deal with noxious pests to be proclaimed from time to time by the Chief Commissioner. The Regulation is in fact a Pest Act.

In the case of Lantana the Regulation provides that no land holder shall be required to clear more than ten acres in one year. This would not apply in the case of a pest like Green Bug. and consequently, the cost would be more, but it is stated that in the case of Lantana "in cases where the cost of eradication is considerable the Government will be prepared to grant Takavi loans for the purpose of meeting the cost." The same leniency could be shown in the case of Green Bug where the cost of eradication was considerable, and I feel sure that the planters, would readily come forward with practical aid in the way of sprayers and supervision of the work by their Scientific Assistant if necessary, were they only sure that eradication could be enforced.

The pest has apparently come to stay for it will be practically impossible to eradicate it from low country crops and each year the danger of infection will be present. Consequently the planting community must make up their minds to tackle it and the cost must be estimated in general estate expenses. If ready for it and all work together to worry it as soon as it appears, there is no reason whatever why it should destroy Coorg coffee as it has done Coffee in other districts. In fact it is more nuisance than danger. But. (and it is a big but.) the danger point lies in the man who having got the Bug on his Coffee will do nothing to eradicate it and allows it to grow strong there and establish itself, escape on to shade trees and weeds, and act generally as a nursery and an infection centre for the rest of the district. It is to get at such an one if he should exist that legislation is necessary in my humble opinion.

I was glad to find that now the monsoon rains have begun, the white parasitic fungus of the scale is beginning to show up and kill the scale. With this fungus present, the monsoon will eliminate the adult scale to a large extent, but unfortunately with the advent of dry weather the fungus will disappear and the scale get the upperhand again, and eggs which have escaped destruction by the monsoon, or have been sheltered by ants in their nests, will hatch out and the pest will start again. Consequently the time to be ready with spray and brush, pruning knife and fire, to renew the campaign is at the end of the monsoon and those who have not got sprayers. and the necessary materials for the spray mixture should see to it that they have everything ready before the end of the monsoon, for there is no telling whose turn it may be to be visited next. My advice to all is to be cheerful but *be ready*.

The methods of control which are being adopted at present appear to me to be satisfactory. Trees which have been spur-pruned and had all their leaves removed should be scraped and lime washed and the mulch, &c., under them finally dug in. The lines and their neighbourhood should be cleaned up and kept clear of weeds and rubbish and any vegetables and plants grown round them should be kept under close inspection. With regard to sprayers the ordinary knapsack sprayer of the Four Oaks type though a good machine is too heavy for the cooly who finds a difficulty in pumping and spraying at the same time in heavy coffee with the machine on his back. The small pressure sprayer of the Holder type will, I think, prove the best machine for dealing with coffee which is a difficult crop to spray in any circumstances.

RUDOLPH D. ANSTEAD,
Planting Expert.

CORRESPONDENCE.

Calicut, 16th June, 1913.

THE EDITOR,
Planters' Chronicle,
Bangalore.

Dear Sir,—With reference to Mr. E. S. Clarke's letter to you of 9th ultimo, which appeared in your issue of the 17th idem, we shall be much obliged if you will kindly give the same publicity to the following copy of our letter to Mr. Clarke dated 27th ultimo, commenting on his figures:—

SHIPMENT OF TEA *via* MADRAS.

"We would venture to call your attention to a statement in your letter " of 9th instant to the *Planters' Chronicle* which we think can only have " been made under some misapprehension. We refer to the sentence "..........................and of course putting the Tea on board at Madras is " far cheaper than at Calicut..............."

"We have calculated the full cost to the estate of sending Tea *via* " Madras as compared to sending it *via* Calicut and we give hereunder the " figures in detail:—

PER FULL CHEST OF 120 LBS. GROSS.

" *Via Madras*				Rs.	A.	P.
" Rail to Madras at annas 10/8 per maund ...				... 0	15	7
" Shipping (not including fire insurance)				... 0	8	6
" Freight 30s. per 50 c. ft. equals 3s. per full						
" chest equals	Rs... 2	4	0			
" Less 10%	„ ... 0	3	7			
				2	0	5
				3	8	6
" Add for fire insurance if required				... 0	0	6
Total ...				3	9	0

" *Via Calicut*	Rs.	A.	P.
" Rail to Calicut at annas 6/5 per maund	... 0	9	7
" Cartage from Railway Station to Customs House—about	... 0	0	5
" Shipping (including Fire Insurance)	... 0	6	0
" Freight at 30s. per 50 c. ft.	... 2	4	0
Total ...	3	4	0

"We may mention that we have heard from Madras that the rate of " annas 8, pies 6 for shipping a full chest does not include fire insurance but " that fire insurance can be covered for an extra 6 pies per chest.

"You will see therefore that Calicut is cheaper than Madras to the " extent of 5 annas per full chest if fire insurance is included and annas 4, " pies 6 per chest if fire insurance at Madras is not necessary.

"The above comparison applies of course to the fair weather as " we do not have direct London steamers here during the monsoon. We " have, however, as you know, in the past had direct London steamers " at Cochin during the monsoon. The charges for shipping in Cochin during " the monsoon are 7-annas per chest for breaks over 100 chests and 8 annas " per full chest for breaks under 100 chests, We are not sure what the rail "charges are from Mettapollium to Ernakulam (the station for Cochin) but "you will no doubt know these.. Taking the rail charge from Mettapollium "to Ernakulam as not exceeding the rail charge from Mettapollium to "Calicut, there is still, as you will see from the above figures, 3 annas per "full chest in the case of breaks under 100 chests and 4 annas per full chest "in the case of breaks over 100 chests, in favour of Cochin during the "monsoon as compared to Madras.

"We think you will agree with us that in the circumstances the sentence we refer to in your letter to the *Planters' Chronicle* is no doubt "inadvertently rather misleading."

Thanking you in advance,

We are,
Dear Sir,
Yours faithfully,
Per Pro. Peirce, Leslie & Co., Ltd.
(Signed) J, DELL,
Manager.

Glendale Tea Estate,
16th June, 1913.

THE EDITOR,
Planters' Chronicle,
Bangalore.

Dear Sir,—In connection with the "Green Bug" that has now appeared in Coorg, I have no doubt that many planters, who know that I wrote a good deal on the pest in June 1910, in the *Madras Mail* would be glad to have a few further particulars on the subject.

Now that the pest has got in, it is bound to keep there, as so many jungle and shade trees are Bug Feeders.

It is much to be desired, that our worthy Scientific Officer's sanguine hopes, will be realised, and that the Bug will be kept under, but I cannot think that this is possible.

I still continue the "Spraying" on my small acreage and still maintain that the cost with a sprayer need not exceed Rs.10 per acre per annum, unless the Estate is badly affected.

I do not now use anything more than rosin and soda, as no soap is needed and it keeps temptation out of the way of the cooly. Resin hermetically seals the bug up and all it needs is to be rendered soluble in water, which is accomplished by boiling with washing soda. The method indicated must be rigidly followed, or the result will be disappointing. It has to be remembered, that perfect chemical combination of the soda and resin is wanted, and there is only the one way. A cooly must be carefully and specially trained to cook the stuff the right way.

I have copies of all the letters I published for free distribution to any who want copies.

I will now repeat the way to prepare the solution, as there have been so many corrections, that may perplex at the start.

Get 2 empty kerosine oil tins, which can be purchased usually from oil engine users for about annas 3 each. A tin is just 4 gallons.

Take 1 pound of resin and 1 pound of soda. Powder on any common rock, that is handy, and mix the two well. Place in one of the tins with a pint of water or so and place on the fire. As the mixture melts, add more water, until the tin is about half full. Continue boiling about 2 hours, if necessary. Test by dropping a spoonful into a glass of water, and if the solution is a pretty amber, the mixture is RIGHT, if milky WRONG. Don't use a severe flame., Take off the fire and allow to cool. When cold mix with cold water to the 2 tins full and your stuff is ready to go into the Sprayer for use. Dilute to 10 gallons, for mild attacks, but for virulent attacks, keep to the 8 gallon solution. Don't be tempted to boil too much in a tin at a time. Keep a dozen pairs of tins going, and stock the stuff for the Sprayer.

It takes from 3 days to a week to see the pretty little green creatures turn brown, and the planter finds this a prettier colour for his feelings.

Don't despair if you find lots on again, in a month or so. Be satisfied that the bulk has been killed off. and your crop saved. Go at it again and again Stop in wet weather. Be always ready about January, May and again in September, October to work with Sprayers,

Pardon haste and errors, caused by pressure on time and if more information is needed, I will try and supply it.

I say again I have never given up the spraying, and that I got crop, and have been tempted from the spraying to work INTENSIVELY and to plant up new patches.

Yours faithfully,
(Signed) THOS. BROWN.

RUBBER EXPORTS FROM THE AMAZON.

Mr. G. B. Michell (H. M. Consul at Para) reports that the quantity of rubber exported from Pará, Manaos, Iquitos, and Itacoatiara during the month of March and the three months ended March, 1912 and 1913, was as follows:—

—	Fine. Kilogs.	Medium. Kilogs.	Coarse. Kilogs.	Caucho. Kilogs.
March, 1912—				
To United States...	923,127	269,153	828,225	644,050
To Europe ...	1,114,992	169.333	317,312	619,521
Total ...	2.038,119	438,486	1,145,537	1.263,571
March, 1913—				
To United States...	774,920	119,531	601,034	298,531
To Europe ...	1,349.982	223,488	395.667	1,231,842
Total ...	2,124,902	343,019	996,701	1,530,373
1st Quarter, 1912—				
To United States...	2,836,148	687,022	2,041,416	1,112,458
To Europe ...	3.944,109	463.729	952.110	1,715,972
Total ...	6,780,257	1,150,751	2,993,526	2.828,430
1st Quarter 1913—				
To United States...	2,576,505	439,270	1,824,145	843,961
To Europe ...	4,076,557	711,053	864.381	2,793,177
Total ...	6.653,063	1,150,323	2,688,526	3,637,138

—*The Rubber World.*

RUBBER.

Hevea.

YIELDS OF SOME HENARATGODA TREES.

The Ceylon Department of Agriculture Bulletin No. 4 by Mr. R. H. Lyne, Director of Agriculture deals with the above. Mr. Lyne says :—

"The fame of the Henaratgoda trees as rubber yielders rests upon the performance of the great tree known departmentally as No. 2, which in three and a half years yielded 275 lbs. of dry rubber. There are other trees at Henaratgoda equal in age and size to this great tree, but never having been subjected to systematic tapping, their capacities were unknown. Some of these trees, though they could hardly be expected to equal No. 2, might nevertheless, it was thought, be goood yielders.

At Henaratgoda there are three old Hevea plantations known as the First, Second and Riverside.

The First plantation is from the original seed procured by Mr. Wickham from the Amazon in 1876. The plants reached Ceylon towards the end of that year, and were planted at Henaratgoda in 1877; this plantation is, therefore, thirty-six years old. It contains forty trees planted irregularly the inside trees congested and small in circumference; the outside trees large.

The Second plantation was planted about ten years later, that is to say, in about 1886. with seed from the original trees; it is, therefore. of the second generation. It contains 211 trees planted 12 feet by 12 feet. The contrast between the size of the outside trees and that of the inside is also very marked.

In the Riverside plantation, also of the second generation, there are 81 trees scattered about, the trees being larger than those of the second. The outside trees also show a superiority of growth over their companions.

In October last, it was decided to place the outside trees of the three plantations under systematic tapping, with the object of ascertaining (1) whether any other trees besides No. 2 were good yielders, (2) the effect of room on the yield of Hevea trees.

GIRTH MEASUREMENTS.

Table I. brings out very strikingly the effect of room on the girth of Hevea. The average girth one yard from the ground of the ten trees in the outside row in the Second plantation is 76 inches; that of the trees in the row next inside 44 inches. The trees are tabulated as they grow: for example, No. 220 with a girth of 32 inches is next to No. 221 with a girth of 110¾ inches. The famous No. 2 measuring 117½ inches is not the largest tree, No. 39 (not in the table) being ten inches larger in girth (127¾ inches). Some of the inside trees of the First plantation which are crowded and overtopped are very poor specimens, though presumably equal in age to the others. Thus, No. 20 is 40 inches in circumference, No. 13, 33 inches.

YIELDS OF DRY RUBBER.

Tapping on the 3V system half round the tree of these 38 outside trees was begun on November 1, 1912, and continued to February 15, 1913, when dry weather having set in the trees were rested. Tapping, therefore, took place daily for three and a half months. Tables II., III., and IV. give the weight of biscuit and scrap produced from these trees in the three plantations respectively.

The great No. 2 yielded 45 lbs. 3½ oz. of dry rubber in 76 days, an average of just over 9½ ounces a day. This tree far surpassed any other. No. 439 in the Riverside plantation is next in order to No. 2 with 24 lbs. 9¼ oz., an average of a little more than 5 ounces a day. The next two in point of yield, Nos. 401 and 438 are also in the Riverside plantation. The trees of this plantation averaged for the 13 trees 12 lbs. 6¾ oz., against 11 lbs. 15 oz. of those a generation older and 7 lbs. 12 oz. of the Second plantation. The superiority of Riverside must be attributed to some extent to its proximity to the river.

But the yields from all these trees are good, and can only be attributed to the fact that they have had room to extend in one direction. In Bulletin No. 1 of September, 1912, page 8, the yields of some trees of the Second plantation are given as equal to an average of 1·4 lbs. per tree per annum. These trees are planted 12 feet by 12 feet, and Dr. Lock attributes the small yields to close planting. From this view there would appear to be no escape as within a few yards of these trees others, 12 feet from their neighbours in one direction but in the other with ample room for roots and branches to extend unchecked, have far surpassed them.

BRANCHING.

An examination of the manner in which these productive trees have branched and developed foliage reveals the remarkable power of Hevea to adapt itself to circumstances and to take opportunities. If we may be permitted a pleasantry, we can say that there is nothing of the Turvydrop about Hevea; it despises deportment. Its motto seems to be, "Get to air and light; elegantly if you can, but get there." This power of reaching light regardless of sympathy of dome is a valuable characteristic in the tree, and should be taken advantage of by planters. It possesses this power in a greater degree than any tree with which the writer is acquainted, resembling in this respect a bamboo more than an ordinary tree.

The famous No. 2, the butt of which with Mr. Wickham at its side figured so prominently in a photograph at the recent New York Rubber Exhibition, possesses no symmetry of form whatever at the top. It has a magnificent upright trunk dividing into two at a height of 12 feet from the ground. These two stems then continue upwards, but soon begin to lean outwards, finally expanding into a mass of branches and foliage bending in one direction outwards. The shape of the whole tree but for the fork is not unlike that of an ostrich plume. Other of these trees exhibit the same disregard of shape, though all alike possess large leaf areas.

The foliage of No. 2 extends to a distance of 55 feet laterally from the base of the trunk.

No. 439, the second heaviest yielder, is isolated. The foliage of 401 extends outwards about 40 feet; there is a nutmeg within 8 feet of it. No. 445 has a very fine crown overtopping small clove trees in the vicinity. The foliage of No. 1 extends to 44 feet. No. 7 to 31 feet.

No definite conclusion can be drawn as to the effect of early branching. The two heaviest yielders branch early; No. 2 at 12 feet, and No. 439 at 15 feet; No. 438 also at 15 feet. No. 1 at 5 feet, No. 3 at 7 feet, No. 390 at 12 feet, No. 291 at 15 feet. On the other hand, 401, 85, 90, 221, 23, 36, 40, run up to from 20 to 40 feet before branching.

No. 439, the best yielder after No. 2, is one of the smallest trees under trial. The trees of the Riverside plantation, which gave the highest average yield of dry rubber, have a mean girth of 71 inches, against an average of 89 inches in the 37-year-old trees. All are large trees, but as far as they go these trials seem to show that after a certain size has been reached, increased girth measurement does not necessarily mean increased yield.

ROOT EXTENSION.

Given room the trees have extended their roots to a greater distance than their branches. At 55 feet the roots of No. 2 were of the size of a lead pencil and still extending, but they were not visible at the surface. A root No. I, 1¼ inch in thickness, was observed at the surface 60 feet from the base of the trunk. It then descended into the ground. A root of No. 40 outcrops at 80 feet from the trunk. This tree gave 17 lbs. 5½ oz. of dry rubber in the 3½ months.

THE IMPORTANCE OF ROOM.

These trials seem to bring out very strongly the importance of giving Hevea room to extend in one direction. It is perhaps reasonable to suppose that had these trees room in every direction even better results would have been obtained; but it is not the object of this paper to attempt to evolve the ideal plantation, but to record facts and to offer suggestions based on those facts. The Henaratgoda trees are particularly happy in not having the issue complicated by subsidiary influences. The soil is pure, the trees have never been manured; the ground is not forked or weeded or grazed. Twice a year the bents are cut with a sickle, and periodically the leaves are swept up and taken away, Henaratgoda being a botanic garden to be kept tidy. This is the treatment these trees have been subjected to. There is a river close by, but this does not enable the inside congested trees to give more than 1·4 lbs. per annum. We are driven to the conclusion that the controlling factors have been air, light and root room, these trees having had room at least on one side to extend.

APPLICATION OF THESE RESULTS TO THE QUESTION OF SPACING.

It has not escaped some observers that Hevea trees growing in pairs do not seem to suffer from the fact, and at the meeting of the Committee of Agricultural Experiments held at Peradeniya on March 16th, it was decided to lay out a plantation to test this principle. Fig I is a plan of a plantation based on this principle, but carried one step further, four trees being planted closely together (10 feet by 19 feet) instead of two. Two would perhaps be better than four and one than two, but, the Henaratgoda trials afford good grounds for expecting a plantation, E laid out on the four-square plan illustrated in fig, I would be in time returning heavy yields as compared with present standards. It gives every tree room to extend freely on two sides.

PROPORTION OF LATEX TO DRY RUBBER.

Tables V., VI., and VII. give interesting comparisons of the proportion of latex to dry rubber in the various trees. In the great No. 2 tree the latex is rich, though one or two trees showed a slightly higher proportion of rubber. With the old original trees a mean of 1,270·49 cc. of latex produced 1 lb. of dry rubber, with those of the second plantation 1,311·55, the Riverside 1,454·00. Taking the figures of the old trees as unity, the proportions may be represented as 1, 1·032, 1·160, *i. e.*, 1·042 times as much latex was required from the trees of the second plantation as from those of the first to make one pound of dry rubber.—R. N. Lyne. Director of Agriculture Perandeniya, March 29, 1912.—*Bulletin of the Department of Agriculture Ceylon*, for May, 1913.—*The Ceylon Observer.*

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THE U. P. A. S. I.

(INCORPORATED.)

Contents.

The Scientific Department publishes useful information on three important points namely Tea Seed Oil. Sophora glauca, and Camphor.

A very simple remark by the Editor in last week's issue, has had the effect of extracting a letter from Mr. Danvers, on the subject of Green Bug, which is answered, as requested, by the Planting Expert, which we hope, will convince Mr. Danvers, which is thought to be the best method. While this Green Bug is threatening, it will be advisable to reprint Mr. Brown's articles on the subject, which with his permission we hope to do in our next.

An article has been contributed on the coming U. P. A. S, I. Exhibition, urging the utility of such a show, and asking for the co-operation of all concerned in the various industries. We feel confident, that a varied selection of products will be the response to our appeal; which will interest all sorts of visitors. The Secretary has been frequently asked by the consumers of the products of our industries, what he can show them. The ignorance of these same consumers, is astonishing. But what we believe will add chiefly to the attractiveness of the Exhibition, would be labour saving appliances, and to this end we trust all will help. A series of photographs also, would be much appreciated.

A very interesting article on the preparation of Hevea Rubber is republished from the F. M. S. Department of Agriculture, who issued a Bulletin on the subject. The experiments with solutions will be found valuable, and the remarks on the cause of tackiness in rubber, should be noted. Further experiment will decide, whether this tackiness is due to heat rays or light rays.

The Report of the Superintendent of the Rubber Sub-Station in Hawaii, deals with tapping from the commercial point of view, which shows a good profit considering the cost of labour. Comparing the cost of Hawaiian labour and Indian labour, useful deductions can be drawn.

THE SCIENTIFIC DEPARTMENT, U.P.A.S.I.

Tea Seed Oil.—*The Bulletin of the Imperial Institute* and other Scientific papers have had a good deal to say recently about Tea Seed Oil, and in *Tropical Life* for May, an article appears on the subject from which I gather, that this oil is especially useful for soap-making, and though not obtainable in large quantities, would command a fair price. Assam Tea Seed, is said to contain 43·45% of oil. The residual cake contains only 1·92% of nitrogen and so is not of much value as a manure. It is possible that something might be done with this oil in conjunction with Hevea Seed Oil. In February 1912, the oil was priced at £21 per ton in Hull, and at the present time, since the price of Cotton Seed Oil has risen, it is probably worth more than this, and it would find a market in England for lubricating and soap-making purposes.

Sophora glauca.—By the courtesy of the Director of Agriculture, I have been favoured with the following analysis of *Sophora glauca* made by the Government Chemist at Coimbatore,

	Samples as received.	Calculated on dry matter.	Ash.
Moisture	65·00	—	—
*Organic Matter	33·06	94·45	—
Soluble Mineral Matter ...	1·88	5·38	96·93
Insoluble Mineral Matter ...	0·06	0·17	3·07
	100·00	100·00	100·00
*Containing Nitrogen ...	0·90	2·57	—
Containing Phosphoric Acid ...	0·19	0·54	9·73
„ Potash ...	0·47	1·35	24·14

It will be noted that the plant contains a high percentage of Potash as well as Nitrogen, and Mr. Harrison recommends its use as a green manure for Tea and Coffee. *Sophora glauca*, is a very common plant on the Hills in the Nilgiris, Shevaroys, Coorg and Mysore. It is a small shrub with soft pinnate leaves, a drooping spike of pretty pinkish-red flowers. In Coorg it has been used as a green dressing in Coffee to some extent but, as it is shrubby, it is apt to be troublesome to eradicate. When it can be cut in the jungle, however, and carried into the Coffee it is evidently of great value. In Tea it might be grown with advantage, as it would give a light shade especially in young clearings.

Camphor.—The Superintendent of the Experimental Plantations of the Malay States, recommends beginning to cut Camphor plants in their third year. An acre containing 700 three year old Camphor trees is said to give annually in three cuttings 180 lbs. of Camphor. Distillation experiments show that a yield of about one per cent of camphor and of oil consisting chiefly of camphor, can be obtained from the leaves and branches of trees of five years of age and perhaps younger. The time of distillation ought not to exceed three hours in the case of the leaves and young branches. The proportion of camphor obtained from the leaves is greater than that yielded by the branches, and the yield of the small shoots is more than that of the older branches of trees of the same age. Drying in the open air has no bad effect upon the yield, but this would probably not be the case if the leaves were exposed to the direct rays of the tropical sun.—R. D. A.

CORRESPONDENCE.

Balur P. O.,
Kadur District,
Mysore State;
Kelagur Estate, June 19th, 1912.

The "Green Bug."

THE EDITOR,
Planters' Chronicle.

Sir,—In the notes of "Contents" in your issue of the 14th instant, it is remarked that it is hoped that the N. Mysore Planters have "also ordered Sprayers for the insecticides, as without them the latter will not be of much use. It will be like Hamlet with the part of Hamlet left out."

We have no intention of leaving out the part of Hamlet, but it has been left to the discretion of the individual, should the play unfortunately be produced on his particular stage, to decide whether the official choice of Mr. Sprayer should be adhered to, or whether the part should be enacted by Mr. Brush, a far finer actor in the opinion of some play-goers.

As the Scientific Officer has lately been among the Brushites, it would be of great interest if he would give us his opinion as to the respective merits of Sprayer and Brush.

Yours faithfully,
(Signed) C, DANVERS.

Dear Sir,—Brushing *versus* Spraying for Lecanium scale is an old controversy in the Nilgiris and elsewhere, and there is much to be said on both sides. The case for brushing is, that it is very thorough since the trees can be gone over leaf by leaf and none can escape a coating of the wash ; it is possible that the process kills the eggs, as well as the scales; the coolies like the work better than they do spraying, it being a game after their own hearts which is easy and "finniking."

The case for spraying is, that though difficult, it is rapid, and a large area can be covered in a short time, and by doing a second round, the scale missed the first time is secured.

The great objection to brushing is that it is slow and requiries a large labour force. The average task appears to be five trees per cooly, per day, and if a large area is infected, the pest is likely to get out of hand and spread over still larger areas, before the brushing gang can get round.

The objection to spraying is, that it is difficult, and it is work the cooly is unfitted for, especially with a Knapsack sprayer which has to be pumped. Probably easier work can be done with a Pressure sprayer.

These are the *pros* and *cons*. The cost is if anything in favour of the spraying method, the labour bill being very high in the case of brushing.

Both are practical methods, and I personally incline to favour spraying because it is rapid. Mr. Thomas Brown of the Nilgiris, is a great champion of spraying methods and planters should read what he has written about the success of the method in his hands before making up their minds to condemn spraying, especially without a trial.

If only an acre or two of coffee is infected, and a big gang of coolies is available, perhaps brushing may be the best treatment, but when a big area is infected, and the pest is rapidly increasing I think that spraying is undoubtedly the best way of dealing with the situation despite its obvious practical difficulties.

RUDOLPH, D. ANSTEAD, *Planting Expert,*

U. P. A. S. I. EXHIBITION.

The following circular was sent to all Councillors of the United Planters' Association, but to give it wider publicity it has been thought advisable to reproduce it in the *Chronicle*, so as to invite suggestions how best to make the proposed Exhibition a success, from a wider circle:—

" Referring to my Circular No.9/13 dated June 4th, it was suggested that August 25th would be a convenient date on which to open the Annual Meeting, if suitable to District Associations. It is too early yet to have received replies for the Chairman to definitely fix the date. In the meanwhile, I think it would be advisable to remind Honorary Secretaries, that it is proposed to hold, as usual, an Exhibition of the various products of the different Districts, and I address you, and ask you to lend your co-operation in making the Exhibition thoroughly representative of all that is grown by the members of your Association, and to invite members to send samples. It is hoped with your cordial assistance not only to make the coming Exhibition thoroughly representative, but a permanent record of the progress of our industries from year to year. Such a permanent record would in itself be an education. The office contains nothing to show members who visit it, not only the best of their own Districts, but nothing to awaken a lively interest in the products of others. I hope to hear from you that you will do all you can to induce your members to further this very useful suggestion. Due notice will be given you when the Chairman has been able to fix the actual date of meeting, to enable you to forward exhibits some time before the meeting takes place."

Since writing the above the Chairman has definitely fixed the 25th August for the Annual Meeting, so those who have arranged to send samples for the Exhibition are requested to forward them to the office by the 18th instant to enable us to arrange them for the show.

The idea of holding an Exhibition at the coming Annual Meeting is not original, only the idea of having permanent exhibits at the office is an improvement on it. Primarily the Exhibition was intended to show Delegates attending the Annual Meeting the products of the various Districts, and in 1911, Messrs. Peirce Leslie and Co., and others showed Estate tools, tapping knives, glass collecting cups, etc., and again in 1912 new Coffee Machinery was set up and exhibited. These Exhibitions have proved of great interest and have been voted a success, but the interest aroused in them has been only temporary and evanescent.

Our idea is to have a permanent record in the office that planters, visiting Bangalore, may inspect and carry away with them a lasting impression of our varied industries. Year by year as our knowledge increases, and wider and more scientific methods are adopted in the curing and preparing for the market the various products, it would be both useful and interesting to watch the progressing merits of different properties. Just as errors are but opinion in the forming, seldom is it that one arrives at perfection at a bound. The wiseman is he who will benefit by the mistakes of others, and in the following year show the result of such observation for the benefit of those showing along the same lines, and become a benefactor to the planting community. It is by benefiting by the mistakes of one year that progress will be made and it is by collecting these attempts towards perfection we hope to attain it. Such a permanent record will be of the highest value as an object lesson.

We believe that such an Exhibition will be the means of bringing about correspondence between members of different districts, and bringing members into close touch with one another. Such correspondence would probably have far wider reaching results than may be thought of at present.

One correspondent writes us :—" While always interested in seeing anything NEW as regards Planting, I cannot say that after making the journey to Bangalore, chunks of ordinary rubber, more or less well cured, parcels of coffee, tea, pepper or cardamoms would excite me," but we would respectfully point out to our correspondent, that it is our object to cater for the whole planting community and not for one member thereof. But we are sure, that on reflection, he will recognise that his views are rather narrow minded, and that what may not probably excite him, will be of interest to others, and *vice versa.* Our endeavour is to secure not only his interest and influence, but that of others to procure NEW exhibits, and with this object in our mind, we earnestly ask for the cordial co-operation of all in achieving the goal we aim at.

Though we do not agree with the opinion expressed above by our correspondent, it would be unfair to him to omit to say, that most useful suggestions have come from him, and we quote with pleasurable agreement from him " But what I should be interested in are new appliances connected with the industry. The latest thing in tapping chisels and knives, the last word in spouts, a cheap reliable and handy bucket for latex which could be issued to every coolie and that would keep the monsoon out side the pail, a measuring tape for taking girths that didn't expand daily until it was useless in three weeks. Glass, earthern ware and aluminium cups, &c." We welcome these suggestions, and will try to carry them out, but we should also welcome suggestions from tea and coffee planters.

If only half a dozen planters would evince the same interest as our correspondent in our coming Exhibition, it would be a pronounced success. What is wanted is more men to interest themselves, in the matter and to get others to do the same.

Though not quite germane to the matter, whenever some subject affecting planting comes under discussion, the Labour Question crops up with the fatal persistence of Charles' Head in Mr. Dick's Memorial and makes its ever unwelcome appearance. But as Labour is becoming more and more difficult to secure, labour saving appliances should be, if possible, procured for the Exhibition. These we are convinced, would be much appreciated, and for these we should look to those Firms who are interested in planting industries, and who should be asked to assist, and in this way everyone can help.

At present, the office only contains one show case of Rubber, for which we are indebted to the kindness of Messrs. Allan & Co. There is a complete series of Hevea Rubber, smoked and unsmoked. Samples of Fine Hard Pará from Brazil, castilloa and ceara.

The Mysore Dassara Exhibition is advertised to take place in October next, and samples shown and kept at our Exhibition could be sent, with the permission of the owners, to the Mysore Exhibition, thus saving planters the trouble of two collections. We have been asked what amount should be sent to form a sample. We consider that 2 lbs. each of tea, coffee, and cardamoms, and pepper would make a nice sample. About the same of each variety of Rubber

F. N.

RUBBER.

The Preparation of Plantation Hevea Rubber

The India Rubber Journal publishes lengthy extracts from *Bulletin No. 17 of the F. M. S. Department of Agriculture*, by Mr. B. J. Eaton, containing an account of a number of experiments which have been made on the best method of preparing Hevea rubber on the estate. The following is a digest of these articles.

The author points out that until comparatively recently, no systematic research has been carried out on practical lines in connection with this subject, and the good results which have been obtained on some estates, are not the outcome of scientific experiments, but the fortunate result of standard or uniform methods adopted by careful managers. Isolated experiments described in various journals cannot be relied upon, as it is quite probable that more than one variable factor has entered into many of these experiments where the latex has not been collected by the experimenter himself or under his supervision. The dilution of the latex with unknown amounts of water is one of these important factors.

In the experiments described by the author. the latex was collected in glass or porcelain cups without the addition of water and collected 3 or 4 hours after the trees were tapped and strained through fine brass sieves to remove dust, and naturally coagulated rubber. The trees from which the latex was obtained were about 12 years old, and had not been tapped previously. The method of tapping was 'light,' only four cuts, eighteen inches apart on one quarter section of the tree being made.

The first experiments made were with a large number of different coagulents in different quantities, and a table is given showing the minimum quantities of the principal acids and salts required to effect complete coagulation of a normal latex, containing about 30% of dry rubber. These quantities or a slight excess are also sufficient to coagulate the same quantity of a latex when mixed with an equal quantity of water. The results are at variance with those obtained by Parkin and Crossley, and the author concludes that for the acids experimented with, there is no constant 'maximum figure' above which coagulation is incomplete. The results are, in fact, anomalous in each ease, for while certain intermediate quantities of coagulant appear to be a maximum, when a still larger quantity of coagulant is added, coagulation again takes place, and again, when a certain maximum figure in obtained, for a coagulant of one particular strength, this figure is different for an acid of another strength.

If a large excess of a dilute solution of a coagulant be added to latex the dilution of the latex is so great, that no coagulation occurs, since in the case of dilute solutions of coagulants or diluted a latex coagulation depends on a time factor and is not immediate. The failure to coagulate thus depends on the dilution and not the excess of acid. This is confirmed by the fact that a similar or larger quantities of the same acid or other coagulant produces complete coagulation when stronger solutions are used, because coagulation in this case is almost immediate.

The anomalous results produced by strong solutions of coagulants may also be explained on similar grounds. The rubber coagulum or clot, which is formed, occludes or absorbs the strong coagulant, and since local clotting or coagulation occurs immediately when a strong solution of coagulant is added, a portion of the latex is not acted upon by the coagulant. The partial coagulation of this remaining serum will no longer occur even when more coagulant is subsequently added, and the failure to coagulate is thus, in one respect due to the method, being really due to the impossibility of obtaining a proper admixture of coagulant and latex, before coagulation occurs.

The above explanation appears to be the most satisfactory one for these apparently contradictory results, and there is no need to assume, as Crossley has done, a 'maximum figure' for any coagulant.

The experiments and results also show the wide limits in the quantities of coagulant which may be used, and the variation of this limit with the dilution of the latex and the concentration of the coagulant.

They also demonstrate the effect of excessive quantities of these acid coagulants on the rubber produced; excessive quantities have a deleterious effect and produce peculiar forms of coagulation.

With regard to the best coagulant, it is concluded that the acids, organic and mineral, undoubtedly, take first place as coagulating agents, and considered only from that standpoint, there appears to be little or no difference between acetic acid, which is at present used on almost all estates in Malaya, and other organic or mineral acids. The quality of the raw rubber also appears to be independent of the acid used, any defect being due to the quantity of acid used, and not to the nature of the acid, although excessive quantities of mineral acids have a much greater deteriorating effect on the rubber produced, than an excess of acetic acid.

The ultimate choice of the most suitable coagulant will depend on the following consideration, (*a*) the keeping properties of the rubber, (*b*) the strength of the vulcanized rubber, (*c*) the danger attached to the use of the coagulant. (*d*) the cost.

At the present stage, acetic acid is to be recommended as the most suitable coagulant to be used, although it is possible that this may be replaced later by sulphuric acid, which appears to give equally good results and is more economical. In this preparation of pale crepe by the addition of small quantities of sodium bisulphite, the cost is only slightly increased.

Experiments carried out with different strengths of coagulant, indicate that dilute solutions are preferable, as it is possible to obtain better admixtures of coagulant and latex with them and no local clotting occurs. A 5% solution of Acetic Acid is a very suitable strength, and a quantity of 3 fluid ounces per gallon of pure latex or 1¼ fluid ounces per gallon of diluted latex containing about 15% of dry rubber is sufficient.

Experiments to ascertain the effect of dilution of the latex with water proved that if an average latex (containing about 30 per cent. of dry rubber) is diluted with water beyond a certain limit, no coagulation occurs with the minimum amounts of coagulant given on a previous page, This maximum limit is usually about two volumes of water to one volume of pure latex.

Beyond this dilution limit, not only must a larger quantity of coagulant be used, but, it must be of greater concentration, since the addition of large quantities of a dilute coagulant only causes further dilution of the latex. For example, it has been found that, in the case of a one per cent. acetic acid solution, 10 volumes of this acid per 100 volumes of pure latex, effects complete coagulation.

This same quantity also approximately effects the coagulation of 300 volumes of a latex containing about 10 per cent. of dry rubber, (*i. e.*, pure latex diluted with two volumes of water). Beyond this point, however, no quantity of a one per cent. solution ot acetic acid, however large, is able to coagulate a more diluted latex and an acid of greater concentration must be used. These results are not in accord with Parkin's experiments carried out in Ceylon, since Parkin states:—that dilution has no effect on the amount of coagulant required. Parkin's results are, however, at variance with other experimental work on the coagulation of colloids in general.

Apart, however, from the effect of dilution on the amount of coagulation required, the question of the effect of this dilution on the resultant rubber, is of much greater importance.

The addition of water to the cups, which is or has been a common practice in all estates, is not to be recommended, since it is impossible to supervise the amount added in each case, and the dilution of the latex caused by such addition, is very variable. owing to the great variations in yield of latex by individual trees.

Latex can be collected, with very little natural coagulation in the cups, without the addition of water to the cups, provided glass or porcelain cups are used, and these are kept thoroughly clean.

Any dilution of the latex should be carried out in the factory, under supervision, so that the amount of water added is known.

It would appear that slow coagulation with a quantity of coagulant not much in excess of the minimum necessary to effect coagulation is preferable, and produces a rubber of better quality.

Rapid coagulation, which is caused also by using excessive quantities of coagulants, causes certain defects in 'sheet' rubber, such as air bubbles or 'coagulation marks,' which have been described before.

Other investigators have shown that the coagulation of colloids other than solutions of latex, depends on a time factor.

When strong coagulants or excessive quantities of coagulant are used, coagulation takes place immediately, whereas with the minimum amount of coagulant. complete coagulation takes place after a period of several hours.

If the rubber coagulum be removed from the serum as soon as coagulation is effected, it is found to be very soft and difficult to handle, whereas, if it is allowed to stand over-night, as is usually done, the clot contracts to form a firmer and more cohesive mass, and the rubber probably has better mechanical properties.

One disadvantage in allowing the rubber to stand for such a period before passing it through the rollers, is that darkening or oxidation takes place. This can be prevented to a great extent, however, by keeping the rubber from contact with air by complete immersion in the liquid serum. This is accomplished usually by covering the surface with a heavy board, so that the rubber is completely under water.

It is, therefore, recommended that the latex should be coagulated slowly by using only a slight excess beyond the minimum amount of acetic acid necessary, and by using a dilute (five per cent,) solution of the acid; the resulting rubber being left overnight and passed through the machines on the following day.

The action of sunlight was investigated on account of the frequency with which tacky samples of rubber were met with in some factories. It was invariably observed that these isolated cases of tackiness were found on samples exposed to the sun's rays near doors or windows.

Samples of rubber, both crepe and sheet, were consequently prepared and dried by exactly similar methods. In one case the sample was hung in the room and kept from exposure, and the second sample was suspended in a window exposed to the sun's rays. Several samples were treated similarly. In a very short time the samples exposed to the sun's rays became tacky, the tackiness increasing with the length of exposure. Samples of crepe appeared to become tacky more rapidly than sheet, owing probably to the greater amount of surface exposed. Another observation which proved that the tackiness was due to the exposure, was the fact that where rubber samples were protected by the wooden bars of the window in which they were suspended, the surface of these places was quite free from tackiness.

Whether this tackiness is due to light rays or to heat rays, has not yet been ascertained. The exact nature of the tackiness, has also not yet been ascertained.

It has, I think, already been sufficiently proved by the work of other investigators, that the ordinary darkening or rubber samples is due to an oxidising enzyme, usually known as an 'oxidase,' which exists in the latex derived from the trees.

In the case of Castilloa latex, the darkening of the latex itself is very marked and rapid, the surface becoming perfectly black when the latex is allowed to stand for only a few minutes exposed to the air.

The dark discolorations of the latex and rubber produced by these exoidases, are produced by coloured oxidation products of certain substances which exist in the latex together with the oxidase, so that the process is perhaps preferably described as an 'oxidation' process. The rapidity of the oxidation process is increased by certain salts, and inhibited by others, and the intensity of the darkening depends on the action of the oxidised substance, as will be shown by experiments to be described in this section.

One interesting feature in connection with this problem which it has been possible to investigate by experiment, is concerned with what is known as 'black latex.' Frequently on estates, certain trees yield a latex which, as it exudes from the tree, rapidly becomes darkened, the colour varying from pink to black.

This phenomenon is not constant for any individual trees, and a tree which yields such latex will, often subsequently yield a normal white latex without any apparent cause for such change.

The actual cause of the blackening, is due to the fact that the fluids which exude with the latex when the tissues are cut contain a larger proportion of the oxidisable substances which are acted upon by the oxidase in in the latex than is contained in normal latex.

This is a more probable explanation than the alternative one, namely, that this latex contains a larger proportion of the 'oxidase,' since a very small quantity of 'oxidase,' is capable of acting on a comparatively large amount of the oxidisable substances under proper conditions.

By avoiding contact with the air, a much lighter coloured rubber is produced, as the subsequent darkening which occurs after the rubber is washed and while drying is not marked, since the oxidase is soluble in water and removed to a great extent from the coagulum.

The darkening which does occur, is evidently due to the 'oxidase' which is precipitated together with the protein matter along with the rubber, and is not subsequently removed in the washing process.

This explains why it is possible to produce much paler 'crepe' rubber than 'sheet,' since the crepe is more thoroughly washed in the machines by being broken up in the rollers.

Steaming.—Another method of producing pale rubber—but this can be done with 'crepe' rubber—is to raise fhe temperature of the latex preferably by passing steam into the latex, or heating it in vessels surrounded by steam, to a temperature of about 80 deg. C. A short treatment by this process, destroys the 'oxidase,' and the rubber subsequently coagulated in the usual way, is very pale in colour.

A modification of this method, which is effective in the case of 'sheet' rubber, and which has been adopted on one or two estates, is to immerse the sheet (after washing) for a few minutes in nearly boiling water in a tank. The 'oxidase' remaining in the rubber is thus destroyed, and no subsequent darkening occurs on drying.

This method, however, is not to be recommended without further experiment, since it is very probable that the treatment of the freshly coagulated rubber, or the latex, with steam is detrimental to its mechanical and physical properties.

Action of Sodium bisulphite.—The value of sodium bisulphite as an inhibiting agent, is clearly proved by the experiments described in this section,

Other experiments were subsequently carried out, to ascertain the minimum quantity of this reagent necessary to produce an almost perfectly white rubber.

These experiments proved that 2 oz. per 10 gallons of latex, was sufficient for the purpose.

Thie gives 2 oz. of sodium bisulphite per 15 lb. of dry rubber, assuming a latex containing about 1·5 lb. of dry rubber per gallon (*i.e.*, a normal latex diluted with an equal quantity of water).

A beautiful pale crepe is obtained in this way in every case, and the small quantity of bisulphite, most of which is subsequently removed by the washing process, appears to have no deleterious effect on the rubber, even after the rubber has been kept for many months.

This treatment, is therefore, recommended for the preparation of pale 'crepes' and 'sheets' for which there will always be a market demand for certain purposes of the manufacturing industry.

The process is very economical, and amounts to less than one shilling per 300 lb. of dry rubber with sodium bisulphite at ½*d.* per lb. In the preparation of pale rubber, the abnormal 'black' latex described above should be collected separately.

One of the commonest defects in rubber samples, is that described under the fourth heading.

Samples are often found full of minute air bubbles, often appearing like white spots, and in some cases quite large and easily identified, The surface, too, is frequently found to be rough and pitted, where air bubbles have formed and have burst. These bubbles are frequently elongated, and appear to run in one direction. The actual cause of these bubbles, is the use of too concentrated a latex or too strong an acid, or an excessive quantity of acid, or perhaps the three causes combined.,

In general, however, these defects are caused by the use of a too cencentrated solution of acetic acid or an excess of the acid.

Report of the Superintendent of the Rubber Sub-Station.

By W. A. Anderson.

TAPPING CEARA RUBBER.

The Ceara tapping on the Nahiku plantations, has been directed chiefly towards the development of a system of tapping that would yield the largest amount of rubber per unit of labour, without injury to the tree, and curing the product in such a way, as to make it satisfactory to the manufacturers.

Many methods, which would give profitable results in most tropical countries with their cheap labour, were found to be impracticable here with labour, at approximately $1 per day. No satisfactory incision method for tapping the Ceará tree without removing the outer bark, has so far been found. At the same time, aside from the expense involved, the injury which results from the frequent stripping of the entire outer bark makes this undesirable.

In July, 1911, after a considerable amount of experimenting, tapping on a commercial scale, was started by, removing the bark to a height of about 19 inches, and pricking with a heel pricker, making pointlike incisions, run vertically, on four sides of the tree at each tapping, The latex was allowed to run to the ground; and left there until the following day, when it was coagulated. The rubber was then collected, in a very dirty state, washed with a single macerator, vaccum dried, hung in the air for one to two weeks, and then shipped. The average yield per day's labour, involved in preparing the trees, removing the bark, tapping, and collecting, on 5 year -old trees, on 70 acres, in two months, was approximately 2 pounds of washed rubber. It was found, that after two weeks of tapping daily, the yield fell off to such an extent, as to indicate the suspension of tapping.

On trying to resume operations after a rest of two weeks, it was found that the flow of latex was hindered by the new outer bark, that was forming a scaly, powdery covering, which gradually became thicker and tougher, preventing the flow, so that the form of incision, could no longer be profitably made without stripping the bark again. Experiments in removing the bark on the 18 inches next higher up, showed that too little latex reached the ground, and that which remained on the tree could not be readily collected. Jobbing with a flat knife blade, making a horizontal incision on this newly stripped area, gave a better flow of latex, but the expense of collecting, proved impracticable both with and without a previous application of acetic acid.

These experiments, however, demonstrated two fundamental facts. First, that a knife jab made horizontally. gives better results than one made vertically; second, that the portion of the tree just above the ground, to a height of about 6 inches, yields rubber in much larger quantities than any other portion. This area is never tapped when collecting cups are used, as the spout is necessarily inserted high enough to conduct the latex to the cup, set on the ground, and the tapped area is all above the spout, and, consequently, above the most prolific section of the tree.

The second of these facts, was utilized in the development of a system which has undoubtedly given better results in proportion to the labour involved than any other. By this method, the bark is removed to a height of about 6 inches, and cuts made with a very thin knife blade from the ground to the top of this stripped surface. The latex is allowed to flow to the ground and coagulate. The following day the rubber is collected and new cuts made at the same time.

The advantages are obvious. Only the richest portion of the tree is utilized, and at the same time, the portion where injuries heal most quickly, After the first cutting, the collecting and cutting are performed at the same time, thus saving ene-half of the walking that would be necessary in passing from one tree to another if there were separate operations. The cutting knife is used to facilitate the removal of the rubber from the soil in collecting, so that there is no time lost in changing tools. The labourer carries his bucket in one hand, and his knife in the other, sets the bucket down, naturally nearest the hand that is freed, slips the knife under the lump of coagulated rubber, on the ground, lifts the rubber with the free hand, aided by the knife, deposits it in the bucket, and makes his new cut in the tree with the knife in the other hand, lifts the bucket with the free hand and passes on. It would seem, that the number of motions involved is reduced to a minimum. The largest amount of rubber collected in this way, by one man in one day of 10 hours' tapping and collecting, is 9 pounds of washed rubber. though, the average yield for 100 acres during six months' tapping, is somewhat less than 4 pounds.

The disadvantages. lie chiefly in the fact, that so small a portion of the tree is tapped. The yield per tree at each tapping is small. in some cases 1 pound of washed rubber to 400 trees. The number of tappings possible per year, as indicated by a six months' trial, is about 48. with two strippings per year. The removal of the bark appears to be less injurious on this area than higher up, and it is probable that the trees would stand this removal. Each stripping after the first is more difficult, as the cuts make the renewed bark very rough, and it breaks off in small patches instead of coming off as is the case with the first stripping. If the cut is made properly, it heals without a ridge, and more quickly here than elsewhere on the tree. Attempts to continue this method higher up on the tree, have not so far proven successful.

Having thus found approximately the maximum yield per day's work, attention was directed toward increasing the yield per tree, with a view to getting a proper adjustment between these two, which will be the point of diminishing returns. As satisfactory results were not obtained by continuing to remove the bark in horizontal strips, vertical strips were tried. First, a strip about one-third inch wide, was removed with a broad, U-shaped knife, gauged to remove only the outer bark, exposing the inner bark for incision. The incisions were made with a blade of the same width as the stripped surface, at regular intervals, along the length of the strip. In this way the yield per tree per tapping was increased, but too large a portion of the rubber remained on the tree as scrap, which could not profitably be collected. The application of a solution of acetic acid caused practically all the latex to coagulate on the tree, here it was collected to better advantage. To widen the stripped surface, a second cut was made 1 inch or more from the first, and the bark between these two cuts was removed. This is done quickly and simply. The wider strap is treated with acetic acid, and incisions made at intervals of about 2 inches, with a blade 1 inch wide, so sharpened, as to touch the cambium at only two points instead of along the entire edge. The rubber is collected one hour after tapping.

The experiment is not yet completed, only one week's tapping having been done. It is found, however, that one man can make the incisions as fast as two men can collect and three men in one day can incise, and collect from about 800 trees exclusive of stripping, securing about 1 pound of washed rubber to 70 trees. Four tappings, can be made on each strip before exposing a new surface. Including stripping and all labour, results for the week, were at the rate of 2⅔ pounds per day's work.

For the purpose of comparing this method with the one previously described, which gave the maximum yield per day's work, we may call the former method A and this one B. Calling the average yield per day's work in A 4 pounds, and the average yield per tree one three-hundredths pound, we get 4 pounds from 1,200 trees in one day's work. In B we get 2 2/3 pounds from 186 trees in one day's work. It is obvious, that were the number of trees available unlimited, A would be the better method. Since on any plantation, however, the number of trees is necessarily limited, the total profit on labour from a given number of trees will determine the relative value of the two methods, From 50,000 trees A would give 167 pounds in 4,123 day's work. At $1 per day and $1 per pound (the approximate present values), profit on labour would be $125'33. B would give 683'4 pounds for 268'8 days' work, leaving a profit on labour of $414'60 from the same number of trees, from which it appears that B is the more profitable plantation method, so long as the value per pound of rubber remains greater than one-half the cost of a day's work.

This tapping was done in the last week of June, It is probable that better results can be obtained during the latter half of the year, as the trees are not in full leaf before the middle of July.

CURING AND MARKETING CEARA RUBBER.

The rubber obtained, was shipped direct to manufacturers in New York. The first shipment vacuum dried, was valued at 10 per cent. below the best Pará, and sold on that basis. Two later shipments, treated like the first in every way, but not vacuum dried, were valued over 25 per cent. below Plantation Pale Crepe. While the last shipment from which returns have been made, partly vacuum dried, was sold at 10 per cent. below Ceylon Fine Pale Crepe, and brought $1'15 per pound. The rubber is now all being vacuum dried and pressed, while still warm from the dryer into sheets, about 2 inches thick, 10 inches wide, and 3 feet long, weighing approximately 20 pounds each. The loss in washing and drying rubber thus prepared, has been found to be 2 1/5 per cent.

The conclusions from the work so far done are, that tapping method A is the cheapest and most desirable, where the trees to be tapped would furnish work for all the labour available, but method B gives greater profit from a given number of trees, and that either method can be carried on commercially, at a profit, under present conditions. The product, though very inattractive as it comes from the field, is capable of being turned into rubber of the first class, without too great expense.

Contemplated experiments on a commercial scale, to determine the effect of fertilizers on the yield of latex, have not been carried out, but it is hoped, that some work of this sort can be done in 1912.—*Annual Report of the Hawaii Agricultural Experiment Station for* 1912.

SOILS: FERTILISERS.

Soil; Effect of partial sterilisation of——on the production of plant food. II. Limitation of bacterial numbers in normal soils and its consequences. E. J. Russell and H. B. Hutchinson. J. Agric. Sci., 1913, 5, 152-221.

The conclusions reached previously (this J., 1911. 471; 1912, 1045) have been confirmed and extended. Besides bacteria the soil contains another group of organisms, provisionally identified as protozoa, which are detrimental to bacteria; they multiply more slowly and have a lower power of resistance to heat and antiseptics, hence the number of bacteria present in the soil is not a simple function of the temperature, moisture content and other conditions. Indeed, it often has no connection with these factors, but depends on the difference in activity of the bacteria and protozoa. In partially sterilized soil only the bacteria are left. In such soil bacterial multiplication is favoured by an increase of temperature or by variations in the moisture content in the normal manner. The protozoa are killed by any antiseptic vapour or by heating the soil at 55° —60 °C.; they suffer considerably at 40° C. and their activity is depressed on cooling the soil to low temperatures. Sterilization by heat effects a decomposition of the organic matter and simplifies the bacterial flora by exterminating some of the varieties. These effects become more pronounced as the temperature at which sterilisation is effected is raised. Maximum bacterial numbers are found in soils which have been heated to the minimum temperature necessary to kill the protozoa (about 60° C.): the number then corresponds with that present in soils sterilised by means of antiseptics. In soils heated to 100° C. although the number of bacteria is at a minimum the decomposition effect is at a maximum. The addition of unsterilised soil to partially treated soil leads to an increase in bacterial numbers and a still further production of ammonia and nitrate unless too large a quantity of these substances is already present. But the subsequent depression in bacterial numbers consequent on the development of the protozoa is generally without effect on the rate of decomposition, apparently because it does not set in until too late.—E. F. A.—*Journal of the Society of Chemical Industry.*

Preparation of Bordeaux Mixture.

Experiments made by Mr. L. A Hawkins (U. S. Department of Agriculture Bulletin No. 265) indicate that Bordeaux Mixture may be made by adding *concentrated* calcium hydroxide to dilute copper sulphate, or *vice versa*, provided the mixture be sufficiently agitated. By this method the inconvenience of diluting the substances in separate and necessarily large vessels is avoided. To render it adhesive, Mr. Hawkins recommends 2 lb. of rosin fish-oil soap to 50 gallons of a 3-2-50 Bordeaux mixture. Next to rosin fish-oil soap, ground glue appears to be the most effective adhesive. Without a suitable adhesive the value of Bordeaux mixture is very seriously reduced.—*The Gardeners' Chronicle.*

New Work on Rubber.

The Cambridge University Press will publish shortly a book on *Rubber and Rubber Planting*, by Dr. R. H. Lock. It deals with the history of the use and cultivation of rubber, its botanical sources, the botanical physiology of rubber and latex, the diseases, chemistry, and manufacture of rubber, and with rubber planting.—*The Gardeners' Chronicle.*

The Planters' Chronicle.

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THE U. P. A. S. I.

(INCORPORATED.)

Contents.

For those who are occupied in growing the various rubbers, an interesting article is published about the different rubbers in Brazil, by which, the rubbers of the two countries can be compared.

Mr. Danvers writes us two letters, one of which, that on Treating Stumps with Chemicals, is answered by the Planting Expert.

Those letters and articles of Mr. Brown, promised last week, on Green Bug and its treatment, are published, and should be carefully read by all coffee planters, as they throw sound light on the treatment of this pest. We are much indebted to Mr. Brown for his permission to publish these letters in a concrete form. They are very applicable at this juncture. when all coffee planters' thoughts are turned to this subject, To our mind the most valuable lesson to be learnt from these letters is, that of hope, and that taken at the proper time, there need be no fear of great damage being done.

As the Annual Meeting is coming on so soon, it has been thought advisable to print some letters from Mr. Manders and from Mr. Kendall, dealing with Rubber matters, which should interest the Rubber Planters of Southern India. We have some hope, that the Rubber Planters of Southern India will be represented at the Exhibition to be held in London in 1914. It is an opportunity that should not be allowed to slip by—and we trust, that at this Annual Meeting, it will be decided, that all Southern Indian products shall be exhibited.

From the Annual Diplomatic and Consular Reports, a Report on Tea and Coffee is published, giving figures which should be read with interest.

An article on Hevea Rubber Seed Oil as a poonac is published, showing what a valuable bye-product every rubber planter has at hand. Up-to-date machinery will doubtless add to its value.

THE SCIENTIFIC DEPARTMENT, U.P.A.S.I.

Manihot Rubber in Brazil.—The prospects of Ceará rubber in Southern India are bright, but many enquiries reach us as to the yield which is obtained on estates in Coorg and elsewhere and details of tapping &c. I hope that some authoritative figures will be given to the Annual Meeting of the U. P. A. S. I. this year. In the mean time the following interesting information is quoted from a letter in *The India Rubber World*, written by the Editor, who is making a tour of South Brazil. Ceará planters here will read this extract with interest, and can compare the Brazilian conditions with those on their estates.

"*The Manihots* cover an immense area of the healthy uplands of Southern Brazil, a territory running 1,000 miles north and south and as much east and west. There are sections where it does not appear at all and others where it is inaccessible. In eleven of the great Brazilian states, it is found wild, but its gathering is chiefly in the states of Bahia, Ceará, Piaughy, and Maranhao. So far, the planting of Manihots in Brazil, has been in the states of Bahia, Minces, and Piauhy. It is estimated that there are at least three million trees in the Brazilian plantations at the present time.

"Only a short time ago, only one *Manihot* was known, the *Glaziovii*. To-day four distinct types are recognised. The *Manihot* was formerly called the *Jatropha elastica*, and it is a blood cousin of the *Manihot utilissima*, which produces sweet cassava, and the *Manihot palmata*, or bitter cassava. The product of the various *Manihots* is called Ceará, Manicoba, Jequie or Manihot rubber.

"In tapping the *Glaziovii* and *dichotoma*, the outer bark is first removed, and the tree trunks tapped in zig-zags. The roots are pared half herringbone fashion, but roughly. On the tree trunk, the latex is caught in cups, but the general procedure is, to tap the trunk low down between the roots and dig a shallow hole at the base of the tree. Into this the rubber milk trickles, its watery content being absorbed by the soil. The sand, with which the hole is dusted, sticks to the rubber and makes it easier to handle, and also decreases its value very considerably. In the past, the Ceará milk was allowed to coagulate on the tree, and the result was a good dry rubber containing some bark. Some of the planters are now preparing *Manihot* rubber in sheets that are clean, dry, and in every way excellent. Most of the rubber at present comes from trees scattered over a vast wild area, impenetrable, except by native tappers, who are paid by weight. The result is, as a rule, very dirty, wet rubber, badly coagulated and containing stones, bark and dirt. Wherever it is possible to gather the latex in receptacles, clean rubber of fine quality is the result.

"The *Manihot Glaziovii*, or Ceará rubber tree, grows to a height of forty feet with a diameter of twelve inches. It has many branches, the lowest of which is about six feet from the ground. The bark is dark purple with transparent film-like epidermis which curls off as the bark is removed. This exfoliation is usually removed before tapping. The leaves are large and are divided in five, sometimes there are seven parts. The leaf stalk and veins are whitish. The planters were deceived at first by the favourable appearance of this tree, and planted it extensively, but it did not produce well. It is found wild in Ceará, Parahiba and Rio Grande do Norte, and is deciduous and thrives in dry lands and mountain regions, in fact will grow anywhere.

"The *Manihot dichotoma*, or Manicoba of Jequie, derived its last name from a town in the State of Bahia, which is the centre of commercial trade in this rubber. It is a small tree with a trunk scarcely exceeding ten inches in diameter. The bark is smooth and purplish in colour, with parchment-like epidermis similar to the *Glaziovii.* The leaves when new, are of peculiar shield-like shape, and later become digitate. It is found in the south eastern districts of the State of Bahia and along the Paraguasu and Contas rivers. It thrives best in red clay soil, and is rarely found in sandy soil, or if so, gives much less rubber.

"The *Manihot heptaphylla* is a small tree growing to the height of seven to sixteen feet, with a diameter of four to six inches. The trunk is comparatively short and stocky, dividing into two or three branches which form a full leaved top of a lively green colour. The bark is dark grey in colour and the leaves are usually divided in seven lobes. The seeds are light coloured, without the sharp edges, thereby differing from the Ceará, and are larger. The tree is found exclusively on the right margin of the San Fransisco river growing in the mountains and rocky places.

"The *Manihot Piauhyensis* originated in the state of Piauhy, and although small in size, is most important as a producer of rubber. It resembles the heptaphylla, with a height of seven to sixteen feet and a diameter of four to six inches. The trunk, smooth and light grey in colour, divides into two or three branches forming a full spreading top. The leaves are usually divided in five and sometimes seven parts. They are digitate in form with the points rounded, a peculiarity of the *Piauhyensis.* This tree found in the state of Piauhy along the dividing line of the State of Bahia, grows principally on the small mountain slopes and ridges."

With regard to yield, the author says, so many different figures were given, that it was difficult to reconcile them. Dr. S. C. Quinn, however, states that, "the tapper works approximately six months in the year covering January to June. He takes one set of 650 trees on the average, tapping on Mondays and Tuesdays 250 trees per day, and on Wednesdays 150. On Thursdays and Fridays he re-tapps Monday's and Tuesday's lots, and on Saturdays, those he tapped the previous Wednesday. The same trees are tapped twice a week. With *Manihot* as with *Hevea* the so-called wound response is very marked.

" In the season, his out-put may be taken on the average at 360 kilos of damp rubber, equivalent to about 475 lbs. market rubber, or say, equivalent to about 285 lbs. actual dry rubber."

Dr. L. Zehntnet gives the following figures for the yield obtained from Manicobas of Bahia ; the figures are pounds of dry rubber from 700 trees in 60 days :—

2 year old trees, 185 lbs. ; 3 year old, 277 lbs. ; 4 year old, 370 lbs. ; 5 year old, 463 lbs.

Departmental.—The Planting Expert will probably remain at headquarters for the next two months, occupied with laboratory work, and matters connected with the forthcoming Annual Meeting.

The Scientific Assistant for Mysore has just completed a tour of inspection of the Kalisyndicate Experiment Plots, and the Green Bug infested area. He reports favourably upon the latter.

The Scientific Assistance for Coorg is engaged upon Kalisyndicate Experiment Plot work in present.

R. D. A.

CORRESPONDENCE.

Glendale Cottage,
24th June, 1913.

THE MANAGING EDITOR,
Planters' Chronicle,

Green Bug.

Dear Sir,—My article on "Green Bug" please insert following correction:—

For "Take one pound of Rosin and one pound of soda,"
Read "Take two do do do do."

We found from experience that the larger quantity of Rosin is best, as there is less scalding of tender leaves and better sealing up of bug.

The word printed *resin* should be *Rosin* as the other orthography is apt to give a wrong impression and any other resin may be tried with negative results!!!

Yours faithfully,
(Signed) THOS. BROWN.

TO THE EDITOR,
Planters Chronicle.

Dear Sir,—We are all very much obliged to the Scientific Officer for his clear and thorough exposition of the respective merits, and demerits of spraying and brushing, and to the editorial remark that led to it.

I shall look with interest for the reprinting of Mr. Brown's articles on the subject of Green Bug treatment—for though we have all read them, I suppose, a compact reproduction at this juncture, would be very acceptable.

Yours faithfully,
(Signed) C. DANVERS.

Kelagur, July 1, 1913.

Treating Stumps with Chemicals.

THE EDITOR,
Planters' Chronicle.

Dear Sir,—I was much interested by a cutting on the above subject, which was reproduced in your issue of the 24th May last, and shall be greatly obliged if any of your readers who have tried the method therein advocated, (equal parts of nitric and sulphuric acids) will give information on the following points:

1. The best time of year to operate.
2. Whether both green and dry stumps can be equally well-treated.
3. What effect, if any, it has on the surrounding cultivation.
4. What is the size of the "big stump" that requires ½ a pint of the mixture.

And will the Scientific Officer kindly say if he thinks the "well-fitting plug" is for the purpose of keeping out rain, or keeping in fumes? For in the former case, it need not be so very well-fitting if used in the dry weather.

Yours faithfully,
(Signed) C. DANVERS.

Kelakur, July 1, 1913.

No. 513/1913.

Office of the Planting Expert,
Bangalore,
3rd July, 1913.

THE EDITOR,
Planters' Chronicle.

Sir,—I have not tried this experiment of destroying stumps with a mixture of Nitric and Sulphuric Acid, myself, bnt it has been tried recently by the Scientfic Assistant for Coorg, and the treated stumps are now under observation. The plug is I presume to keep in the fumes and the acid, for I was told that in the Coorg experiment, there was a considerabie evolution of gaseous fumes and the acid foamed up a good deal. I would warn anyone conducting experiments, with this method that these acids are dangerous to handle and should not be put in the hands of coolies.

Since your correspondent is interested in the matter, I will arrange for the Scientific Assistant for Mysore to carry out some experiments with the method.

Yours faithfully,
(Signed) RUDOLPH. D. ANSTEAD,
Planting Expert.

Spraying Green Bug in Coffee.

At a moment when the appearance of this pest in the coffee districts of Mysore and Coorg is causing some anxiety in the minds of the Planters of both districts it has been thought advisable to reproduce such letters on the subject that have appeared up to date. Mr. Brown, who has given the subject much attention, has very kindly given us permission to republish those that he has written, giving his methods of spraying and his prescription of ingredients, with good results on his Estate. Many inquiries have come to the office asking for information and we trust that those inquiries will be best met by the reproduction of Mr. Brown's letters.

[1. LETTER APPEARING IN THE "MADRAS MAIL," 22ND JUNE, 1910.]

"Having treated some coffee with rosin, soda and soap, as recommended and largely practised by Mr. Nicholson, both with brushing and spraying, I am anxious, considering the immense importance of the subject, to communicate the results so far, in the hope that it will be found interesting and helpful to my brother-planters. I would have preferred carrying on my trials for a year ere going into print, but much valuable time may be lost thereby and loss continued to unfortunate proprietors of coffee estates. I have found Mr. Nicholson's wash excellent, applied either with brush or sprayer. The latter has, to my mind, failed so far, in our hands, owing to two causes, *viz.*, dilution of the wash for the sprayer, and wanting to see results as rapidly as is seen with the brushing. Brush work I have found very expensive, as a cooly (with all defference to the opinions and statements of others) can only do from seven to ten large trees, and these only apparently thoroughly. On a 5 acre block I got the work done at Rs.8 per acre, but here the trees were very sparsely covered with foliage, owing to repeated and neglected attacks of the bug. On larger trees in another place the cost has been undoubtedly Rs.30 per acre for labour. The average cost here, however, let me explain, was Rs.10 an acre, because only a third of the estate was done. The cost of the material, *i.e.*, of soap, rosin, soda. each 1lb. to 4 gallons of water, and 80 gallons per acre, works out to about Rs.5-

only. I used No. 16 paint brushes, which can be obtained at 6 annas from Messrs. Hoe and Co., Madras, and found these far superior and more economical in every way from the coir brushes of cooly make. The injury to the trees is *nil*, too, as compared with the coir.

"Three hours after the brushing, not a single bug remains green to the naked eye, and in a few days there is a burst of new leaf that is quite encouraging. I find, however, that three days after, a few small bugs are visible here and there, and these soon spread, of course, as the planter knows only too well. Still, there is enough done to my mind to urge men to adopt this treatment at once and most vigorously, for given, as with me, Rs.2,000 worth of crop on 30 acres, it is certain that an expenditure of Rs.1,000 on treatment of the bug will insure all of the crop being picked, while without it not a half will be obtained. Thus, with the treatment one spends practically *nil*, and has healthy trees at the end of the crop for the next year. I need hardly say that the procuring of labour for a large acreage at the supreme moment is almost impossible, and this, possibly, has given pause to planters. With the sprayer, I found that if the 4 gallons be diluted to 10, as most would do, and as advised in Mr. Lefroy's work, the result is, so far as a careful inspection after a week can indicate, failure, but with the same strength with the sprayer as with the brush, although the day after and for many days, there is a most disappointing appearance, and the green with the venomous V staring you in the face, from day to day more and more are browning off, and it seems at the time of writing that the sprayer will, as anticipated by our Scientific Officer, triumph. If my anticipations turn out correct, I should be sorry not to have given the earliest intimation of possibilities, so I trust I shall to pardoned for rushing into publicity so soon after the experiments.

"When Mr. Lefroy visited these Hills and gave a practical demonstration with this sprayer, I was present and was one of the first who invested in a sprayer, through our energetic Secretary, Mr. Brock, of Kotagiri, who, I fear, found that the application was ineffectual. Anyhow, Mr. Brock moved on a couple of years after to pastures new and the Nilgiri Planters' Association lost one of its most energetic and most appreciated members. I feel now that the mistake was that the mixture was not nearly strong enough to kill the insects. A neighbour, however, adheres to somewhat the same method as shown us then, and declares he has had steady success with it for the past five years, and it was to his kindly urging that I owe the fact of my again turning to the spraying, which has resulted in this letter."

"It may be as well to give clearly, and in simple language, the mode of preparation of the mixture:—Take 1 lb. of each of the following:—Rosin, soap and washing soda. Powder and mix the rosin and soda, placing the mixture in a kerosine tin with a little water. Place on a gentle fire and boil, adding cold water from time to time as the stuff boils up. Continue for about an hour, then add the soap shaved into slices, stirring up until all is melted. Remove from the fire and leave to thoroughly cool. When cold add more cold water to fill up the tin (4 gallons). To apply with brushes, proceed exactly as a man does with his chin for shaving. The greater the lather, the better the result. I have called this "Nicholson's shaving brush application." For the sprayer, use the 4-gallon mixture without addition of more water. A double nozzle does good enough work, and is quicker. A cooly can easily spray 300 trees in a day, or, say, an acre in three days, I would advise a "Knapsack Sprayer" per 10 acres, which means that for a 200 acre garden, 20 sprayers and 20 coolies only, employed for a period of a month at a time, for each of, say, three sprayings are needed.

The cost would work out as follows:—

Material for an acre	Rs.	5	0	0
Boiling for three sprayings As. 9 a spraying ...	„	1	11	0
Labour at Re.1 per spraying	„	5	0	0
Renewals for sprayers approximately ...	„	0	5	0
Total ...	Rs.	10	0	0

This is the cost given by Mr. Nicholson for the brushing system; but whereas his is an average cost, this is the particular cost for the affected acreage only. I shall at all times be pleased to allow anybody to visit the places on which the spraying is being done, so that personal inspection might be added to the information here given. For those around Coonoor, Carolina is quite handy, while the Katharine Falls Estate, Hallacarry Village, can be seen by any planters out in that direction.

"It will be necessary, I should add, that the treated trees should be cultivated if the bug is to be kept off. I have noticed that where owing to cultivation the trees have the power of re-making foliage, the fungus we so much desire to have propagated comes on spontaneously, which is quite a new point deserving attention, for if my observations have been correct, it affords one explanation of how healthy trees throw off this as well as all other pests. Many are not aware that the steel blue lady bird has appeared on the Adderly Estate in large numbers spontaneously."

[2. LETTER APPEARING IN THE "MADRAS MAIL," 25TH JUNE, 1910.]

"In my article on "Brushing and Spraying Methods" please read "gallons of water, and 80 gallons per acre," for "gallons at water, and 12 gallons per acre."

It will be noticed that the cost of a kerosine tin full of the wash (4 gallons) works out to approximately annas 4 *viz.*, rosin 1 anna, soda 1 anna, and soap annas 2, and for Rs.5 twenty tinsful, or 80 gallons, of wash is obtained. I find that with an ordinary sprayer nozzle, it is difficult to get coolies to run the quantity (80 gallons) over an acre, and I have therefore sent for a "Mistry" nozzle, which is stated to give a finer spray. Failing this, it is advisable to follow the practice of my neighbour and dilute to 8 gallons, but this practice I have no certain knowledge of personally, and if followed results must be carefully watched, not forgetting that time is needed for full action. Personally I think the stronger solution most advisable, even though the cost be doubled for material, per spraying.

"In the cost I lost sight of the three sprayings, which would treble the cost of material, of course, and would make the following correct:—

	Rs.	A.	P.
Material for an acre at Rs.5 per spraying ...	15	0	0
Boiling for 3 sprayings annas 9 per spraying ...	1	11	0
Labour at Re.1 per spraying	3	0	0
Renewals for sprayer, approximately	0	5	0
Total ...	20	0	0

"Given one half of the estate affected, the average cost will be Rs.10 per acre for three sprayings per annum."

[3. LETTER APPEARING IN THE "MADRAS MAIL," 2ND JULY, 1910.]

"I have read with interest Mr. Nicholson's letter in your issue of the 27th June on this matter which is of such supreme importance, just now to a large body of people. I am very glad we have some information, first hand, from the gentleman to whose untiring perseverance we owe the hope of growing coffee in face of this pest. The brush sent to me is very good indeed, and better far than those my coolies did the work with, which however were large enough and gave a splendid lather. I insisted on the latter being produced, and I have a splendid looking field of coffee as the result of the brush work. In face of the possibilities at no prohibitive cost, it is sad to see coffee being rooted up; (I am using stumps for my dryer purchased from a coffee estate) while on large estates of some 300 acres, the crop is only from 3 to 15 tons for the coming season.

"I must, however, take exception to the statement made by Mr. Nicholson that it will take "2 gallons to spray a fair sized tree." I find that the figures I published will need considerable qualification by the side of facts, as revealed by days of spraying, Here are the results as carefully noted and reported:—3,169 trees sprayed by one "Eclair" sprayer at a cost of Rs.7-1-11 for all labour inclusive from the 6th to the 29th June (24 days). No work was done on Sundays, so the actual number of days is less. Material used 127½ lbs of each of soda, rosin and soap. Cost is as reported at anna 1, anna 1 and annas 2 per lb., Rs.31-14-0, or say about Rs.12 per acre per spraying against my corrected figure of Rs.20 for three sprayings. Here we have (*vide* my published figures) 127½ x 4, or 510 gallons, for, say, 3 acres, or 170 gallons per thousand trees, or 1·36 pint per tree. This, however, is double what it should be with a good nozzle I think, and is for very bad cases, neglected for long. The trees, however, from shade and manuring and partial brushing work are large. Now I feel pretty sure that with the brushing, as we did it, the cost would have been for material Rs.5 only; but labour Rs.30, The fact that planters have gone in for brushing in either a desultory manner (as I did myself) or not at all speaks for itself. It may be that there is still much to learn of the correct manner of applying, so as to bring down the cost. This planters must watch, and it is sincerely to be hoped that results will be published, not in any carping mood, but with an earnest desire to help.

"I hope to state that to-day, weeks after spraying and brushing, the latter is showing cleaner trees and planters must be careful about deciding what they will pin ther faith to."

[4. ARTICLE APPEARING IN THE "P. C." ON MAY 27TH, 1911, IN PLANTERS' PAPER NO. IV.]

Notwithstanding the heavy and prolonged rains Coonoor enjoyed during the last N. E. Monsson, leading to the hopes expressed by our Sc. O. that this pest will be less in evidence in the current year, virulent attacks of young bug may be seen on almost any estate that is afflicted with the pest, and unless vigorous measures are adopted, and where adopted now persevered in, hopes are likely to be sadly disappointed, we feel sure.

We last wrote of "Spraying" *versus* "Brushing" in June 1910. At that time "Bug" had already played sad havoc with young berries and caused a loss of a large percentage and weakened a larger, yet the adoption of regular spraying has resulted in much gain to us in total of crop picked, and what is of far more importance, the vigour of trees for the next crop. The gain has been marred by the severe and prolonged cold and by the unprecedentedly severe drought through which Coonoor is still passing.

We have found it quite possible to keep 17 acres of Coffee clear of "Bug" with following:—

1 Good Sprayer (we now use the "Four Oaks") 1 man and a boy on Rs.12 a month. spraying for roughly 150 days in the year, and using daily

1 lb. of Washing Soda, costing delivered 10½ pies
1 lb. of Rosin of a common kind, delivered 21 pies,

and have discarded the use of Soap altogether as being unnecessary. This saves a lot in supervision and watching, for however much coolies dislike soap when they pay for it, the case is otherwise when it can be obtained by breaking the Commandment!

The cost then works out as follows :—

Labour at Rs. 12 for 6 months (150 days) ...	Rs.	72	0	0
Material at 3½ pies per day for (150 days) ...	„	24	9	9
Cost on 17 acres at 5-11-0 about ...	Rs.	96	9	9

The first cost may be double or treble of this, if the whole area be badly affected, but once got under the above is, if anything, over the actual cost. We shall be glad to allow personal inspection and inquiry at Carolina, Coonoor, by anybody interested, who is prepared to approach the subject with an unprejudiced mind, and who is earnestly inclined to learn, and to benefit the Planting Community.

We would like now in this connection to quote from page 83 of Mr. Lefroy's " Indian Insect Pests" and to accentuate the fact that the Book was published in 1906, and the information made available to us long before that by personal visits and demonstrations of Mr. Lefroy.

" Rosin has for many years formed the principal ingredient of many excellent washes for sucking insects. When boiled in water with a suitable chemical, rosin dissolves, forming a clear brown wash which can be safely applied to plants at a strength ...." a rosin wash of this kind on drying forms a varnish. which asphyxiates some insects by closing the stigmata on the sides of the body through which they obtain air.

We would like to accentuate the fact that the results of spraying on the " Bug" are not to be noticed in a few hours as with brushing (where it is presumable some of the bug is even brushed off mechanically, to work up again) but for days and almost a week after. We have observed that the bug crawls into the varnish and is entangled even as the flies are by " tangle-foot" and that the drops of stuff gradually percolate down the tree in every direction, slowly in moist weather as is naturally to be expected. Not the least part of the advantage over brushing is that all bark is covered with a spray, which is hardly the case with brushing, particularly when one is not there to watch.

We have on 30 acres of Coffee 2 sprayers at work near the Hallacarry Village, the figures of which work out to the same lines as here given.

As regards crop. We picked on the whole 47 acres less than one ton last year, and 2½ tons in the current year, with abundant promise of complete restoration of the Coffee to its old condition, which, however, here, we would state was never very good, for the produce at no time topped 3½ tons, in all, in the past 8 years, during all of which time the " Bug" has steadily made headway, not entirely uninterrupted, for measures of doubtful utility and great cost were followed, of which more anon, should it prove interesting to your readers.

Vigorous manuring operations and the old style of pruning have, with the confidence gained in the results of the spraying. been adopted, and success or failure shall be honestly reported for this paper.

London, 23rd May, 1913.

The Secretary,
The United Planters' Association,
South Parade, Bangalore,
S. India.

Dear Sir,—Kindly find herewith particulars of trophies that have been offered by the Rubber Growers' Association, London, in connection with the next Rubber Exhibition, of which I am sending prospectus by separate post. Many of these trophies are important to all rubber-producing countries as well as to Manufacturing Countries.

Mr. Henry C. Pearson of America is offering a thousand dollar silver cup for the best means of extracting the latex from the wild trees of the Hevea, Manihot and Castilloa species; by the best means he implies one that is relatively of the greatest value. This is important to Brazil, Mexico and Plantations of the East, and other rubber countries of the world. In all trophies to the value of £1,500 are being presented for competition for the better production of the crude rubber, and also several trophies for the manufacturing section.

Yours truly,
(Signed) A. STANES MANDERS.

[*Inclosure.*]

The Committee of the Rubber Growers' Association have decided to offer the following trophies for the Rubber Exhibition, to be held in London, June 1914.

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1. That the Rubber Growers' Association Medals be offered for the best commercial samples of Plantation Rubber exhibited in the following classes :—

CLASS 1.—Crepe.

CLASS 2.—Smoked Sheet.

CLASS 3.—Assorted invoice, embracing No. 1 Rubber and Scrap Grades.

Note.—Samples entered for competition to be wharf-drawn samples, in each case representative of a break or invoice of not less than 50 cases of Rubber, and such samples must be certified by the Wharfingers as having been drawn within three months of the opening of the Exhibition. The awards to be given on the judgment of the Standard Qualities Committee of the Rubber Trade Association of London.

2. That a Gold Medal be given by the R. G, A. for the best exhibit connected with Plantation Rubber grown in the Middle East, to be awarded by Judges to be appointed by the R. G. A.

3. A prize of £50 and a Gold Medal to be given by the R. G. A. for what is adjudged to be the most valuable improvement connected with the Collection or Preparation of Plantation Rubber, (open only to Managers or Assistants on Estates), such improvement to have been introduced between the 1st July, 1913, and the 31st March, 1914, at which latter date all claims must have been lodged with the R. G. A. in London. These awards to be given by Judges to be appointed by the R. G. A.

4. That the R. G. A. Gold, Silver and Bronze Medals to be given for the three best exhibits of Rubber-flooring in Tile or Sheet form. Open to Manufacturers of any country.

5. That the R. G. A. Gold Medal be given for the exhibit composed of the greatest variety of articles made from the Rubber for commercial and domestic purposes. Open to manufacturers of any country.

6. That a prize of £50 and a Gold Medal be given for the discovery and application of such new use for Plantation Rubber as may be adjudged the most valuable; special consideration being given to the weight of the Rubber which such application is likely to consume.

6, Mincing Lane,
London, E.C. 11th June, 1913.

To the Secretary.

Dear Sir,—The increasing output of rubber from the East, points to the advisability of those interested in Rubber Plantations organising with the object of fostering new uses for the product.

My Committee would point out that an organization exists, both in India and Ceylon, for pushing the sale of Tea from these countries, but so far no steps have been taken by the Plantation Rubber Industry to find new outlets for the product.

The Committee of this Association, in order to give some incentive to place rubber to new uses, proposes to offer one hundred guineas at the Rubber Exhibition to be held in London next year, for the best new use for rubber.

It has been in the mind of the Committee that if each individual Company took a small interest in the object of pushing Plantation Rubber, it would probably result in a larger consumption, and it is suggested that an Association be formed with a view to achieving this end.

There are some 530 Rubber Companies mentioned in the new Book about to be published by this Association, and if each Company would subscribe a small amount, say 10/- for every £1,000 capital, to such a scheme, a fair sum would be available, and. with a practical Committee would be in a position to consider any scheme, such as laying experimental Rubber Roads, etc., and if thought desirable to foster such enterprises.

As there would be no promotion expenses in forming such an Association, all moneys subscribed would be available for expenditure for practical benefit to the Industry.

My Committee will willingly subscribe £50 to such an Association, and will be pleased to hear the views of your Directors on the proposition.

Should sufficient number of approving replies be received, my Committee are prepared to take further steps to formulate a practical scheme.

By Order of the Board,
(Signed) A. KENDALL,
Secretary.

THE EDITOR,
The Planters' Chronicle.

The above is a letter I have addressed to all Rubber Companies and trust you can publish same,

COFFEE AND TEA.

Statistics are as a rule very dry reading, but the following information, which has been extracted from the *Annual Diplomatic and Consular Reports*, may be of some interest to Coffee and Tea planters.

In the Dominican Republic, a great increase of coffee production is reported for 1912, after three very poor years, but it is still far smaller than in 1908. As in the case of Cacao, the quality is good, but too little care is taken in preparation and selection. The bulk of the coffee is grown at Moca, near Santiago, but the best quality comes from Barahona and Bani in the South West. Barahoni coffee, sold at 9½*d.* in the New York market. 2,295,147 Kilos. (2,254 tons) were exported during the year 1912, chiefly to the United States, France, and Germany.

The following are the figures for coffee production in Java during 1912, and the estimates for 1913: in tons.

	1912.	1913.
Government—		
Java (Arabica)	4,011	2.525
Liberica	308	266
Robusta	567	446
Private—		
Java (Arabica)	10,826	4,420
Liberica	3,273	3,076
Robusta	15,295	17,910

33,240 tons were exported during the year 1912.

With regard to Tea, 61.831,660 lbs. were exported from Java during 1912. The following account of the industry is given by the British Consul:—

"Although the prices obtained for Java Tea have been good. the year on the whole has not been so remunerative to planters as 1911. Production has steadily increased, exports for the year being fully 22 per cent. in excess of that of its predecessor. This, in a great measure, is due to extensions of older estates and new areas coming into bearing, as the weather conditions. during the period under review, have not been very favourable. Large quantities of wet leaf from native gardens were purchased by the factories, which tended, in many instances, to lower the standard produced. Exports to Russia show a marked decline, while those to the Netherlands and the United Kingdom, have each exceeded that of the previous year by fully 5,000,000 lbs. The average prices obtained in the London and Amsterdam markets, ranged from 5¼*d.* to 8¼*d.* and 4⅞*d.* to 8*d.* per lb. respectively. Prices ruling in the Batavia market, were above the parity of the foregoing. The following figures give the exports to the different countries for the past two years.

	1911. lbs.	1912. lbs.
Netherlands ...	22.649,400	28,333,536
United Kingdom ...	15,501,500	21,285,516
Australia ...	5,578,600	6,511,976
Singapore, for transhipment to North China and Russia ...	3,237,600	1,936,058
Russia ...	2,005,300	1,470,298
Canada and America ...	403.800	380,162
Other countries ...	1,142,300	1.914,114

Approximately 2,000 acres were under Tea cultivation on the East Coast of Sumatra at the end of 1912, but no tea was exported during the year.

RUBBER.

Hevea Rubber Seed Oil as a Poonac.

At the Annual Meeting of the U. P. A. S. I. in 1910, the Planting Expert called attention to the possibility of extracting the oil from the waste Hevea Seed (*P. C.*, V. p. 364), and during the following year, published notes on some preliminary work done with it, by Messrs. Peirce, Leslie and Co., at Cochin, giving the analyses of the residual poonac obtained (*P. C.*, VI. p. 122, Sc. O. Paper 58). Since then, several articles on the subject have been published in these pages, including a letter from Prof. Dunstan of the Imperial Institute to the Planters' Association of Ceylon, pointing out the benefits likely to be derived from the industry (*P. C.*, VI. p. 170); an article on the subject published in the "Bulletin of the Imperial Institute." (*P. C.*, VI., p. 402); and analyses of the poonac, from Messrs. W. Graham and Co. (*P. C.*, VI. pp. 580 and 784).

Since then, Mr. Wicherley has established a plant, for crushing the seed in Colombo, and in the *Tropical Agriculturist* for June, the following article appears above his name, describing the results he has obtained, and discussing the future possibilities of the oil.

'It is over two years since, I began seriously to consider the posibilities of utilising Para Rubber seed, both for its oil and its residue kernel, as cattle food. After many tentative experiments which all proved the highly valuable qualities of the seed under analysis, I put down a plant at Grand Pass, Colombo, with a view to treating this bye-product on a commercial basis. Planters were at first rather shy of our proposals, but eventually, we were able to obtain all the seed our stores would hold, at the price which left the planter a net profit of about £1 per ton, which was evidently highly satisfactory, since we never received a single complaint from any of our customers on this account. The initial work of organising supplies, was both tedious and costly, and it was not until the end of October, 1912 that I was able to congratulate myself on the fact, that the seed in stock was more than sufficient for my work. I had the previous year and early in 1912. personally canvassed the Hull Oil trade, submitting samples of Ceylon seed only, I also obtained seed from Malaya, but for some reason or other, they deteriorated in an alarming manner, so I gave them up as experimental samples. The seed was submitted in both the undecorticated and the decorticated state, being crushed separately and carefully analysed to determine the respective value of its constituent parts.

"Among the firms to whom samples were submitted, were the well-known British Oil and Cake Mills of Hull and Great St. Helens.

"I received their report, signed by the General Manager on 1st January this year, and the following are among many of the interesting conclusions arrived at by them respecting my consignments;—

"'I have much pleasure to report to you, that we have made a very careful examination of the samples of rubber seed which you sent us. The seed that came over in the shell, would not be serviceable for cattle food, as the shell is dangerous to animals. The seed should therefore be decorticated. I have pleasure to attach herewith three analyses. You will note our Chemist reports, that he finds your seed contains approximately 4 kernel and 53 shell. I can now further advise you of our general experience in this connection. The cake is rich in feeding value. With regard to the soil, we think the place this can take amongst other oils, has now been fairly well established, It comes under the Drying Oil class and appears to be one of the best natural substitutes for Linseed Oil that has yet been found. It seems equally serviceable for the soap maker. We do not suppose there can be any difficulty whatever in finding a ready market for the Oil in considerable quantity.

" ' According to our crushing experience, the Decorticated kernels on the basis of to-day market value would be worth to us about £9-10-0 per ton delivered to the U. K. Port. On this calculation, the seed in the shell would be worth £3-15-0 per ton. As to quantity, a considerable business could be dealt with at once, and there would be no difficulty in disposing fairly rapidly of 1,000 tons.—J. W. Pearson, Managing Director.'

" I enclose the general analyses referred to in the report, and these are all borne out by analysis taken locally in Colombo quite recently

" The question of decortication bothhered me considerably. I obtained three of the best decorticating machines on the market, but the almost equal proportions of shell and kernel presents at present an insurmountable obstacle to a rapid and effective separation of the two parts. The kernels must be immediately dried after decortication, otherwise they deteriorate rapidly, and every insect known and unknown, seems to lay claim to it as a rare delicacy. They will not, however, attack the seed when dried. The only enemies at this stage are the rats and squirrels, who are inordinately fond of them.

" Hereunder are the analyses above referred to :—

COPY OF ANALYSIS OF DECORTICATED (SUN DRIED) RUBBER SEEDS.

Oil	50·36	per cent.
Moisture	7·20	„
Albuminoids	17·06	„
Carbonydrates	18·72	„
Ash	2·66	„
	100·00	
Sands	0·18	

COPY OF ANALYSIS OF UNDECORTICATED RUBBER SEED HUSK (OR SHELL).

Oil	0·96	per cent.
Moisture	12·14	„
Albuminoids	1·75	„
Carbonydrates	11·15	„
Wood Fibre	73·60	„
Ash	0·40	„
	100.00	
Sands	0·18	

" I think, the foregoing proves conclusively that planters possess a valuable bye-product in the waste rubber seed that is annually allowed to rot on the ground. Most of the seed we purchased, was collected by boys. I understand that a fair profit was obtainable by the whole of the planters who supplied us with seed. At any rate, we had no complaints on that score. Several thousands of tons were offered in from Malay States, but the price was prohibitive, and I am afraid, that just at present there is not much chance of securing supplies outside the F. M. S. and Ceylon, although the question is undoubtedly worth the serious attention of Pará Rubber Planters wherever the *Hevea Brasiliensis* may be found.

The Planters' Chronicle.

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(INCORPORATED)

Contents.

The Scientific Assistant of Mysore contributes an interesting account of the life history of the Green Bug, which, coming at this time will be read with interest by all planters, when the pest and the best way to subjugate it, is uppermost in most men's minds. The Planting Expert, in commenting on the Scientific Assistant's writing, draws attention to a paper already published in the *Chronicle*, describing the relation of Ants to Scale Insects. This paper should be read and studied in connection with the Green Bug, He also comments on different Sprayers. and in conection with this, a letter from Mr, Nicholson is published, who is an advocate of brushing rather than of spraying—at all events in its earliest stages. We trust this letter will lead to some discussion on the merits of brushing and spraying.

The Report of the Annual Meeting of the Kanan Devan Planters' Association, which was very well attended, is published.

The Theni Bridge came in for some deservedly outspoken words from the Honorary Secretary, endorsed by the Chairman.

Messrs. Ewart, Maccaughey & Co's Report on Tea is published as being of interest to the Tea Planters of Southern India. The comparison of prices between 1912 and 1913 for May—June shows slightly in favour of 1912, though the fall is but small.

The uses of Rubber appear illimitable. We shall wait the report on the extraction of gas from Rubber which was to have been read in the third week of June, with interest.

We are indebted to the "Rubber World" for an article on Rubber Manuring which gives proportions of artificial manures to be used on various classes of soils.

Members are reminded that the Annual Meeting of the United Planters' Association takes place on the 25th August, and that proposals that they wish added to the Agenda paper should be sent in to the Secretary with as little delay as possible.

Scientific Officer's Papers.

CXIX.—GREEN BUG IN MYSORE AND COORG II.

The following account of the life history of the Green Bug and its methods of spreading emanates from the Scientific Assistant for Mysore:—

" Scale Insects and Mealy Bugs belong to the order of Insects known as Hemiptera (meaning half wings), or true Bugs. They are a very low form of life, and consequently differ very much from our ordinary ideas of an insect, and for this reason many people are not familiar with their habits of life. I propose, therefore, to give a short account of the life history of our new pest, popularly called 'Green Bug'; its technical name being *Lecanium viride*. I am not an Expert Entomologist, and must ask you to excuse any of my shortcomings.

" The following life history of Green Bug may be taken to apply to the large majority of other Scale Insects, but not every possible kind.

" Green Bug is bright pale green in colour, with an irregular, but very distinct loop of blackish spots on the middle of the back. The eyes, placed one on each side of the head close to the margin, are a conspicuous black. It is oval in form, rounded behind and subacuminate in front. The back is moderately convex, more particularly in females containing ripe ova. The margin is very thin; the skin is soft and never strongly chitinised. The length varies from 2'50—3'25 mm., and the breadth from 1'50 to 2 mm. The insect is ovoviviparous, the eggs being hatched almost at the time of, or immediately after, exclusion. The adult female becomes filled with eggs and their bodies shrivel up as these are laid until the insect dies. The male is unknown in India or Ceylon, and the species is reproduced by a sexual process.

" Let us follow the life of the insects from the time of being hatched. On hatching they appear as minute insects oval in shape, and in colour almost a transparent white. They are provided with three pairs of legs, which enables them to travel very rapidly. The head is provided with a pair of minute eyes and a delicate sucking apparatus. In this stage they walk about on a plant seeking for a suitable spot in which to insert their suctorial threads. They are able to crawl a considerable distance over the plant on which they were born, and also over the soil and on to another plant. On finding a suitable place on which to settle down, the insect inserts its sucking apparatus to get at the sap of the plant upon which it lives. It then becomes fixed and does not move again; it drops its legs for which it has no further use and grows rapidly larger.

" The second stage of the female is similar to the adult, but smaller and flatter, and without the blackish loop noticeable on the back of the adult. The insects in all stages are crowded on the under surface of the leaves, and on the young shoots of the plants, but more frequently on the midribs and veins.

" Green Bug is very apt to be confused with what is called Green Mealy Scale, or *Pulvinaria psidii*, by those who are not acquainted with it.

" The following two great distinctions, if kept in mind, will soon settle any doubt; (1) Green Bug at no stage of its existence makes wax, while the Mealy Scale does. (2) Green Bug has a *distinct* loop of blackish spots on the middle of the back, while the Mealy Scale has not.

" The Bug was originally found on both Arabian and Liberian Coffee, but has since become almost omnivorous.

"In Ceylon, as most of us know, it was partly responsible for the final abandonment of Coffee. True the Coffee previous to the invasion had been weakened by long and continued attacks of 'leaf disease' (*Hameleia vastatrix*).

"It must not be thought that no efforts were made to check the invasion because there were. The fact was, the insect being so inconspicuous by reason of its colour and small size, that it was not noticed until it had established itself in sufficient force to defy all efforts at extermination.

"The bug attacks both vigorous and weakly trees, but the damage done in the two cases is markedly different. Leaves of vigorous trees may be thickly infested by the insects, and blackened by the consequent fungus, but they do not fall off, neither does the tree sicken; it continues to make fresh growth and the tree on the whole retains a fairly healthy appearance. The contrary is the case with weakly trees, nearly all the leaves fall off in badly infested cases, in fact the tree sometimes becomes practically denuded. The shoots become dry and no fresh wood is formed. This naturally in the case of Coffee results in a total loss of crop.

"The ways and means by which Green Bug may be distributed are many. The Insect when young is able to travel very rapidly. When plants are packed, or growing close together, it is very easy indeed for a healthy plant to become infected through contact, or close proximity to, a scale-infested one. These small insects may be carried considerable distances by wind or water, or by becoming attached to the feet and bodies of birds. It is also very easy for them to be carried on the fur and horns of deer and Sambhur, and also on the feet and bodies of monkeys. Further it is possible for coolies to carry the scales from place to place on their cumblies, and last but not least, Ants are greatly responsible for the distribution of the scales. Most scale insects excrete a sweet sticky fluid, on which many kinds of Ants feed, and it will be noticed that most plants attacked by scales are found to be infested by Ants of some sort. These Ants take care of, and tend, scales much in the same way as man tends cattle, They carry the young scales from place to place and when the weather becomes unsuitable and the scales would suffer, they shelter the young and eggs in their nests, and some species of Ants build mud shelters over the scales on the leaves or shoots, If during the monsoon the nest of the common Red Ant be dug up one will invariably find the young and eggs of some scale insect which they have put there to protect from the wet and cold, and not for food purposes as in sometimes erroneously supposed. After the monsoon, when the weather becomes favourable, the Ants bring out these young and eggs of the scale insects and place them in suitable spots on the tree where the young can feed and the eggs become hatched. Amongst the most common offending Ants which protect scales are the common Red Ant and the little Black Ant which carries his abdomen turned up over his back."

Any organised method of control must take into consideration the part Ants play in the distribution of the scale. In Sc. O. paper 110 (P. C. Vol, VII, p. 580) the relations of Ants to scale Insects was described, and this paper should be consulted. One of the main difficulties encountered when trying to rid an estate of Ants is that these insects get up into big shade trees and it is impossible to dislodge them. It is probably for this reason that the Coffee under big trees is usually the most badly infested with Scale Insects. It is possible that such trees might be grease banded to keep the Ants from passing freely up and down, and it is proposed to experiment with this method. Material for the purpose can be obtained from Messrs. Walter Voss and Co., Ltd., Carlton Chemical Works, Millwall, London E. C.

Some complaints have been received that the spraying mixture of Rosin, Soap, and Soda which has been recommended is difficult to make and unsatisfactory. This is probably due to the fact that the wrong kind of Rosin is being used. It must be good ***English Rosin*** and not the stuff obtained in the bazaar. Native Rosin made from local trees is apt to contain gummy matters which do not completely dissolve in the water and soda and so clog the nozzle of the sprayer.

Very varying reports reach me as to the best type of sprayer to use. While some planters condemn the usual form of Knapsack sprayer which has to be pumped, as being too heavy and cumbersome for the coolies, others say that they have no difficulty with it. The way to use such a sprayer is to turn off the tap at the base of the nozzle rod and pump till a pressure is obtained. Then the sprayer should be put on the back, the tap opened and the pressure maintained by an occasional motion of the pump handle. This procedure is in fact much the same as that adopted by a bagpipe player. If a difficulty is still found in using this type of sprayer, a pressure sprayer of the 'Holder' type should be adopted. In this form of sprayer a pressure is got up first of all which is sufficient to empty the machine without any further pumping.

The Green Bug is a most omnivorous scale and has been recorded to attack the following long list of plants, and a watch should be kept for it on almost everything. Coffee, both Arabian and Liberian; Cinchona, *succirubra* and *officinalis*; many species of Citrus; occasionally on Tea; Guava; Ceará Rubber; Tapioca; Gardenia; Ixora; Plumeria and many garden shrubs; also on Spanish Needle, *Antidesma bunius*, *Hiptage madablota*, *Cadicarpa lanata*, *Moesa indica*, and several species of *Loranthus*.

RUDOLPH D. ANSTEAD, *Planting Expert*.

CORRESPONDENCE.

Coonoor, S. India, 10th July, 1913.

Green Bug Brushing and Spraying.

Dear Sir,

I know of few advocates amongst Planters for spraying, but many for brushing. Long before Mr. Brown I sprayed with Soda and Rosin amongst many other things and found spraying hopeless *so long as bug retained its spreading power*, but now that it has lost that I am myself reverting to spraying, when and where I cannot get enough labour to brush during the early months of the year, when it is urgently required to destroy the first appearances of the bug *on the tips* of the branches. I would recommend reference to the following successful gentlemen for their opinion as to the merits of brushing and spraying. Mr. Bake of Colakamby Estate, Colakambay P. O. Nilgiris.—Mr. Rogers of Adderley Estate, Coonoor, and Mr. W. Deane of Kotagiri, Nilgiris.

Ants require as much attention as the bug. The fact that green bug *begins* on the tips of the branches and nowhere else is what makes brushing such a success.

Yours faithfully,

(Signed) A. G. NICHOLSON.

DISTRICT PLANTERS' ASSOCIATION.

Kanan Devan Planters' Association.

Proceedings of an Annual General Meeting held in the High Range Club, Munnar, on Saturday, June 21st, 1913.

PRESENT.—Messrs. C. Fraser (in the Chair), W. O. Milne, J. M. Bridgman, M. C. Koechlin. A. J. Wright, H. L. Pinches, W. J. Dixon, A. W. John. W. L. Ranking, J. C. Swayne, J. H. Jeffrey, S. H. Paulet, J. S. B. Wallace, W. Fraser, V. L. W. Wright. C. E. L. Ward, G. E. Bewley, Dr. J. S. Nicolson, Messrs. L. H. Ley, J. S. Hawkins, A. G. Murray, and E. A. Hughes (Honorary Secretary). *By their proxy, Mr. E. A. Hughes.*—Messrs. J. C. Abbott, A. H. Gerrard, D. Mackintosh, N. J. Strachan. F. E. Thomas, F. R. Westbrook, and A. W. L. Vernede. Honorary Member. *Visitors.*—Messrs. E. L. Koechlin. G. A. Holden, C. H. Mitchell, L. H. Jacob, K. M. Ross, J. W. Tolson, A. M. Todd, J. Ewart Vernede. Arthur Hall, D. V. Crowe, R. Brown, L. G. Bennett, Fraser, Strachan and Meade.

The notice calling the Meeting having been read, the minutes of the Bi-Annual Meeting and the 2 Extraordinary General Meetings having been printed and circulated, were taken as read and approved.

The following Agenda was then laid on the table:—

(1) Chairman's Speech
(2) Honorary Secretary's Report
(3) Accounts
(4) Labour Laws
(5) Post Office
(6) Theni Bridge and Cumbum Valley Light Railway
(7) Game Laws
(8) Scientific Officer
(9) Bangalore Delegate
(10) The Lady Ampthill Nursing Institution Fund
(11) The S. I. P. B. Fund
(12) Licensing Laws (Arms)
(13) Correspondence
(14) Election of Office-bearers.

On opening the meeting, the Chairman said he was very pleased to see so many members present. As there was a very long Agenda he asked the permission of the Meeting to take the 2nd item of the Agenda first. He did not wish to make a long speech, and he felt the Honorary Secretary's report which was a full one, would explain the Association's work for the past year very clearly. If, after it had been read, there was anything he wished to make any remarks on, he would do so. This was agreed to.

The Honorary Secretary read his report as follows:—

Mr. Chairman and Gentlemen,—As we have a lengthy agenda before us, I shall make my report as short as possible in submitting a summary of subjects dealt with during the year by the Association. I regret, I am not able to give figures showing the various acreages under cultivation at present, as all the Totes have not yet submitted their returns. As far as I know, there has not been a large increase in cultivation. Crop of tea from the district was 8,659,059 lbs. as against 8,204,696 lbs. This is an increase of 5·02% and a record, which is very satisfactory, especially as about 2,000 acres plucked, are not in full bearing yet. It represents an average yield of 650 lbs. all round, as against about 500 lbs., the average Indian yield. The other products Coffee, Cinchona, Camphor, Cardamoms and Rubber are all progressing satisfactorily, and giving good results. I am glad to report, that the year under review has been a very successful one. The average price obtained for the teas has been well maintained, and the result has been very satisfactory to all concerned. From recent reports, it appears that the market is beginning to recognise the value of the high grown Travancore teas. I trust this will be reflected in the prices we shall in future obtain for them.

During the year 9 Committee Meetings, Bi-Annual General Meetings and 3 Extraordinary General Meetings were held.

There is a proposal for discussion and settlement with regard to the local Labour Law.

Medical grants were regularly paid by the Government, and we are very grateful to H. H. Government for their generosity. Efforts have been made to obtain further grants to meet the additional expense incurred by the Companies in the expansion of, and addition to, their local dispensaries, but so far I regret to say without success. We will live in hope that the Government may in time see its way to help us further in this direction.

It is now 8 years since the question of the Theni Bridge was first seriously taken in hand. I regret to say that the condition of things is, if anything worse than ever. The bridge has been partly constructed, fell down, was re-erected, again collapsed, and a very large sum of money has been wasted. The Authorities have now decided that the materials used so far are unsuitable, and they are at present, I believe, engaged in blowing up the bridge as it stands. It is satisfactory to note, that a further sum has been sanctioned by the Local Board, and we can only hope that the Local Board Engineers in view of their previous experiments, will be able to construct a bridge that will stand. So far I consider, and I am sure you will all agree, the work reflects most discreditably on all concerned.

Strenuous efforts have been, and still are being made, to obtain sanction for the construction of the Light Railway from Kodikanal Road to Kuruvanooth. We have decided to send a Deputation to the Government of Madras, with a view to getting them to help us, and the Peermade Planters' Association has agreed to join. I have so far been unable to obtain the figures of the recent traffic survey carried out by Mr. Graham. I have also since been informed that Messrs. Binny and Co., Madras, have approached Government with a view to obtaining a concession for constructing and working this line. I have written to them for information, and I think you will agree it is no use approaching the Government, unless we have the fullest possible information.

There are at present 35 Estates on the books paying a subscription of Rs. 10 each and a cess of 2 annas per acre on cultivated area and cultivated timber. Later, we have to discuss ways and means so that the expenditure and income of the Association shall balance. I regret to say that during the year under review, expenditure exceeded income to a small extent. When going through the accounts, I will explain how this has happened, and we shall be able to arrange that it shall not recur in future.

I am pleased to be able to report that our Postal Service has at last been placed on an efficient and thoroughly satisfactory basis. For this we have to thank Mr. S. Varada Charya, the District Superintendent of Post Offices, who has been unremitting in his efforts to help and satisfy us in this direction.

We had the pleasure, not long ago, of welcoming Mr. R. D. Anstead, Scientific Expert. Although we have not yet received his full and detailed report, what he told us was most interesting, and has given us all a good deal to think about. His suggestions on all points he discussed, were most interesting and sound, and if carried out, will improve our local conditions generally.

The Law for better protection of Game is making steady progress and is receiving the most careful consideration of the Government. I hope when it finally takes shape and becomes law, it will be satisfactory to us all.

The Association paid its subscription to the Lady Ampthill Nursing Institute, and I believe, many members received considerable benefit from its working. There is a proposal, I believe, to have a local Nurse, and this should be decided this afternoon as the subscription for the coming year is now due to be paid.

Mr. Wright was our Delegate at the Sri-Mulam Popular Assembly, and his efforts to forward our interests were most successful. We are all very much obliged to Mr. Wright for his good work, and I hope you will confirm this later when his report will be read to you. We have decided to ask the Government, not to legislate further with regard to our Estate labour. With one exception, all the Associations in Travancore, are of the same opinion, and I have written to those in sympathy with us, with a view to submitting a united protest to Government.

The Association was instrumental in obtaining help for a brother planter from the S. I. P. B. Fund. It is gratifying to report that very much more generous support was forthcoming this year, for this very deserving Fund. I have the honour to be one of the Finance Committee responsible for the working of the Fund, and I am pleased to be able to say that the Fund has been now put upon a sound financial footing.

During the year, I had the honour of attending the U. P. A. S. I. Meeting as your Delegate. I have already given you the details as to what took place and the proceedings have been fully printed in detail.

It is satisfactory to note that the Government have at last arranged an Imperial Committee to endeavour to settle the vexed question of Weights and Measures.

My efforts in endeavouring to press forward the subject of Roads and Railways appears to be bearing fruit, in so far as I have before stated, the S. I. R. are now apparently willing to allow private enterprise to undertake the construction of the line in which we are most interested.

I also had the honour of being elected on a Special Committee to consider Mr. Marden's Finger Print Registration Scheme. The object of the Committee was to endeavour to harmonize the views of the various Associations, and draft some feasible scheme. I am afraid this is impossible, and some other Members of the Committee are of the same opinion. Some Associations, ourselves included, will have none of it, others are lukewarm, and the opinions of those willing to try it, are hopelessly at variance.

My Resolution which was carried with reference to the voting power of the various Associations placed them all on an equal footing.

I had the honour of being elected Vice-Chairman and to the Finance Committee of the U. P. A. S. I., an honour which I greatly appreciated, and which, at the same time I feel, reflects greatly to the credit of our Association. The U. P. A. S. I. accounts which had been allowed to get somewhat behindhand, are now being kept up to date, in a thoroughly business like way. I trust my efforts to forward our interests will be considered satisfactory.

I have nothing further to say, Gentlemen, and in placing my resignation in your hands, I sincerely regret any sins of omission or commission. I beg to thank the Chairman, Committee, and all Members very heartily for the ready help they have afforded me in carrying out my duties, and also for the honour they did me in electing me as their Delegate at Bangalore.

The Chairman then said:—It is now my pleasent duty having heard Mr. Hughes' very full and detailed report of the year's working, to move a very hearty vote of thanks to him, both for it and for the work he has done for the Association during the past year. It is sometimes thought that the position of Chairman of an Association like ours, entails a good deal of work, but I can assure you, in this case it is not so, thanks to Mr. Hughes' energy. I am sure you will all agree that the work of the Association has been carried on most effectively, and its interests most carefully looked after. Mr. Hughes had worked very hard, and I am sure has given entire satisfaction to us all. The vote was carried unanimously.

The Chairman continuing said he had not much more to say in view of the very interesting report they had all just heard. The past year had been a successful one, and he hoped this would long continue. He endorsed every word of Mr. Hughes' strictures with regard to the work done on the Theni Bridge, and he was sure all agreed with him. He was pleased to note that there was likelihood of this important and much needed work being successfully finished shortly, and also that there was a possibility of the construction of the Light Railway from Kodikanal Road to Bodinayakanur being taken in hand without much further delay. The Association, in conjunction with the Peermade Planters' Association, intended to approach the Madras Government, and he hoped this would result in sanction being obtained to have the work started.

The question of further Labour Legislation was a very serious matter and he trusted nothing would be done without the most careful forethought and consideration. He would not detain them longer and proposed that the next item on the Agenda be taken up.

Mr. Hughes then explained the increased expenditure which had slightly outgrown the present income of the Association. After some discussion, it was decided to refer the matter to a Special Committee consisting of the Chairman, Honorary Secretary, and Messrs. H. L. Pinches and A. J. Wright.

Mr. Hughes asked the Association to accord a very hearty vote of thanks to Mr. Ingram for having audited the Association accounts. This was seconded by Mr. Koechlin and carried unanimously.

The Financial Statement was considered satisfactory and passed.

Mr. Swayne's letter with reference to the amendment of the local Labour Laws, was then read. After some discussion, Mr. Swayne agreed to withdraw his proposal.

The Association again finally decided not to support Mr. Marden's Finger Print Registration Scheme.

A letter from the Honorary Secretary of the Nilgiri Planters' Association, suggesting a scheme for the "General Registration of Kanganies" was then read. The Association while approving generally of the idea, decided to refer it to a Committee for consideration and further report.

Mr. Wright then moved the following Resolution:—

" That this Association wishes to place on record its appreciation of the services rendered to the District by Mr. N. S. Varada Charya, B.A., the S. P., Madura Division by the introduction of the new arrangements for the conveyance of Mails by Ropeway and Tramway, and to express the hope that the Government may be pleased to retain him in his present office, so that this district may continue to have the advantage of the extensive knowledge of its requirements, which he has been at so much pains to acquire, and that copies of the Resolution, if passed, be sent to him and to the Postmaster-General, Madras." This was seconded by Mr. Koechlin and carried unanimously.

The Chairman then moved: " That the Hon. Secretary be requested to write to the S.P.O., and request that a service be established between Surianalle Post Office and Devicolam Cutcherry." He explained that at present a letter from Surianalle would have to go to Bodi, up to Munnar, and on to Devicolam and *vice versa*. He thought, it would be possible to arrange for a direct runner for the short distance between Devicolam and Surianalle. The Resolution was agreed to, *nem con*.

The Chairman said he had nothing to add to what had been already said with reference to the Theni Bridge and the Cumbum Valley Railway, but he hoped shortly to be able to inform them that real progress was being made with both.

The Hon. Secretary read a letter from the Chief Secretary to Government, stating that the game Preservation Amendment Bill had been recommitted to a Second Select Committee, and that further progress would be published in due course in the Government Gazette. Mr. Hughes then proposed " That the Planting Expert be made an Hon. Member of this Association." This was seconded by Mr. Pinches, carried *nem con*.

The Chairman then proposed that Mr. Hughes be re-elected as the Association Delegate at the U. P. A. S. I. Conference. He felt that in view of the good work done by Mr. Hughes last year and the very able way in which he had represented their interests, they could not do better than again appoint him. This was agreed to unanimously.

Mr. Hughes thanked the Chairman and the Members for the honour they had done him in again re-electing him.

The question of continuing to subscribe to the L. A. N. Institution, was discussed. It is proposed to arrange, if possible, for a resident local Nurse. The Hon. Secretary pointed out that the Association could not afford to pay her salary from its funds and special arrangements would have to be made. After some discussion it was decided to continue the subscription to the L. A. N. I. for another year, and refer the question of the local Nurse to the Committee for arrangement.

A subscription list for the S. I. P. B. Fund was passed round, and Rs.175 was subscribed.

Mr. Wright then read the following report of his attendance as Delegate to the Sri Mulam Popular Assembly:—

Mr. Chairman and Gentlemen,—I beg to submit the following report of my attendance at the Ninth Session of the Sri Mulam Popular Assembly from your Association,

The Assembly opened at noon on Wednesday, the 12th February 1913 with an address by the Dewan of Travancore, a copy of which (Enclo A) is submitted to you herewith. The Assembly then adjourned until 11 a.m. on the following day, when the ordinary business was taken up. I enclose copies of the Programme of Business (Enclo. B) and of the Schedule of subjects (Enclo. C.) for your information.

The subjects upon which I was instructed to make representations to the Assembly were reached on Saturday the 15th ultimo.

1. The desirability of certain amendments to the Game Preservation Regulation III of 1073.

On this subject. I carefully enumerated the proposals contained in your letters of the 12th and 23rd June, and 2nd November 1913 to the Chief Secretary to Government, laying particular stress on the request that the Game Committee of this Association should be empowered to supervise the working of all Licenses granted within their area, it being understood that the District Magistrate and Superintendent of Cardamom Hills is a Member of that Committee.

My principal point was our desire for the fullest possible protection for Fish in view of the local efforts to establish Trout in the district, and in this connection I quoted some figures kindly placed at my disposal by the Honorary Secretary of the Angling Association. The Dewan was most interested in this subject and put several questions.

The whole representation was most cordially received, and in reply the Dewan promised to place all the proposals before the Legislative Council, which is now considering the amending Regulation.

2. The necessity for amending Section 4 of the Breach of Contract Regulation 11 of 1080 and the undesirability of any addition to the existing Labour Laws.

I found that the necessity for the amendment above referred to, was fully recognized, and that the matter had already been before the Legislative Council, and therefore confined myself to the form of the proposed change.

a. The best amendment being a 3 months' limit from the termination of the contract.

b. As an alternative:—A provided contractor having defaulted by failing to commence work on proper date or by failing to supply a proper number of coolies, ratifies his contract later with the consent of the Contractee, he must be considered to have legally ratified it and so become liable to prosecution for subsequent default even though the 3 months have elapsed since his first default.

I dwelt particularly on the point that we feared the effect of changes in legislation upon recruiting, and emphasised the peculiar situation of this District *i.e.*, situated in Travancore but procuring the whole of its labour from British India.

It is very evident that the Government contemplate a move in this direction, and at the conclusion of my remarks, the Dewan called upon the representatives of the Central and Mundakayam and of the South Travancore Associations for their opinions. Both were without instructions, but while recognizing the exceptional position of this Association, expressed their personal opinions that further legislation was necessary, and when pressed stated that it was chiefly required to prevent inter-estate crimping.

In reply the Dewan said there was no need to legislate for people who did not want legislation, and that in any steps taken, it might be possible to leave this district alone.

It seems to me from what I learnt in Trivandrum, that legislation is imminent, and I would press upon your Association the need for carefully considering the position and for getting into touch with and comparing, views with the other Associations in Travancore without loss of time.

I trust that the representations made will meet with the approval of your Association and prove to have been of use.

I also submit a copy of the Report on the Administration for 1087 M. E. (1911/12) (Enclo. D).

The Chairman proposed a hearty vote of thanks to Mr. Wright for the trouble and care he had taken, and this was carried unanimously.

The U. P, A. S. I. Circular No. 10/13 with reference to the U. P. A. S. I. Exhibition to be held in Bangalore, was read, and it was decided to support it and send exhibits.

The U. P. A. S. I. Circular No. 8/13 with reference to the Indian Post Office Rules, *re* Tea Samples, was read.

Read letters between the Honorary Secretary and the Superintendent of Anchal Post Office. The Association agreed to support the Anchal Post as far as possible.

Read letter from Hon'ble Mr. E. P. Barber, *re* the European Defence Association. After some discussion, it was decided to refer the matter to the Committee for consideration and further report.

The Chairman, the Honorary Secretary, and the Committee then resigned, and Mr. Wright was voted to the Chair during the ballot for the new members, which resulted as follows:—

Chairman	...C. Fraser, Esq.
Honorary Secretary	...E. A. Hughes, Esq.
Committee	...Messrs. H. L. Pinches, A. J. Wright, M. C. Koechlin, J. M. Bridgman and W. J. Dixson.

Papers on the Table—The U. P. A. S. I, Circulars, the Indian Tea Association Circulars, Copies of letters, &c., &c., Association Books, &c., &c.

A vote of thanks to the Chair terminated the proceedings.

(Signed) C. FRASER,
Chairman.

(Signed) ERNEST A. HUGHES,
Honorary Secretary.

TEA.

Messrs. Ewart, Maccaughey and Co., Ltd., report from London, 10th June, 1913, for May:—

QUANTITY OFFERED IN PUBLIC SALES.

1st to 31st May.

		1913.		1912	
Indian	...	53,868	packages	46,675	packages
Ceylon	...	110,648	„	82,370	„
Java	...	440,879	„	14,413	„
		605,395	packages	143,458	packages

1st June to 31st May.

		1912-13.		1911-12.	
Indian	...	1,821,125	packages	1,674,209	packages
Ceylon	...	1,298,915	„	1,156,120	„
Java	...	230,477	„	158,199	„
		3,350,517	packages	2,988,528	packages

Indian—With the Whitsun holidays absorbing a good portion of the month only three small auctions were held, the offerings having dwindled even more rapidly than was expected. The opening showed a very strong market all round and the final Assam invoices in particular met with general appreciation. With a well-sustained export demand, the more stylish among Sylhet and Cachar Pekoes were also doing well, and the supply becoming, of course, more limited with every day, prices in many instances showed smart advances. Sound common leaf, too, was on the up line with anything like fair make in leaf becoming increasingly difficult to find, excepting among an occasional early invoice. Fair-leafed Pekoe Souchong could hardly be quoted under 7¼d. per lb. and up to 7½d. per lb. or 7¾d per lb., the demand ran very strong. Among red teas,, while the stand-away invoices were nearly always sure of a good reception, those which just fell short of what was wanted were irregular and valuations naturally very uncertain. The poor stalky kinds were generally started with all sorts of tentative bids, and as often as not there was no suggestion of a bid at all, and this led to a good deal of taking out. There was, however, in most cases some sort of improvement after the auctions when buyers had the opportunity of having another look at them. All good liquoring Fannings and Broken teas were making very high prices, and where there was real fun, rich, cold-weather character buyers did not seem to mind what they paid. A fair amount of market business has been put through, and those dealers who were lucky enough, or astute enough, to hold stock over and above what they required were enabled to obtain useful profits. In plenty of cases, however, they were chary about selling and preferred to hold on to what they had rather than take any risk of being left short before suitable new season's teas begin to come along

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The light auctions with which the present month opened showed a fairly steady market taking into account how very mixed in character were the offerings. There was a large proportion of Travancore, mostly rather ordinary as regards quality, which resulted in quotations being a little irregular. A few good class Assams made satisfactory prices. New season's Darjeelings from Bloomfield and Moondadotee realised fair averages, but quality was not greatly fancied.

The Indian Sales during the month were made up as follows :—

		Pkgs. 1913.	A. Price. 1913.		Pkgs. 1912.	A Price. 1912.
Assam	...	11,313	9⅜*d*	...	19,010	9⅛*d*
Cachar and Sylhet	...	21,570	5⅝*d*	...	5,460	7¾*d*
Darjeeling and Terai	...	64	7*d*	...	482	9*d*
Dooars	...	9,147	8¾*d*	...	8,524	8¼*d*
Sundry, Travancore, &c.	...	7,535	8½*d*	...	5,965	8⅝*d*
On Shippers' and Second Hand Account	...	4,239	—	...	7,234	—
		53,868			46,675	

Average price of Indian Tea in Public Sale during the month 8⅜*d*. against 8⅝*d*. last year.

Average price of Ceylon Tea in Public Sale during the month 9⅛*d*. against 9*d*, last year,—*Capital*,

Notice.

Mr. R. G. Foster, who attended the last quarterly meeting of the North Mysore Planters' Association held on the 4th June, wishes it to be noted that he abstained from voting either "for" or "against" the Madras Labour Act.

W. H. REED,
Honorary Secretary.
North Mysore Planters' Association,

RUBBER FROM GAS.

At the time of the so-called "scare" with regard to artificial rubber, the Company for the manufacture of which vanished into the realms of silence since its launch upon the world with the *eclat* of Professor Ramsey's name, it will be remembered that the secret of artificial rubber manufacture was described as the polymerization of isoprene. Isoprene is a complex hydrocarbon, the simplest form of which is butadeine. In an announcement which we print elsewhere, it will be seen that from recent researches this latter product has been evolved from coal in the course of gas production. By its polymerization rubber is said to have been produced; but as no cable news on the subject has come to hand, we presume it has not excited the rubber world at home as much as the discovery with which a financial flotation was connected not long ago. Full details were apparently to be made known at the meeting, the third week in June, of the Institution of Gas Engineers, which was to celebrate the 50th anniversary of its foundation. We look forward to fuller details, perhaps by next mail.—*The Ceylon Observer.*

RUBBER.

Manuring of Rubber.

The following is taken from the "Rubber World."—" As to the quantities of fertilising ingredients to be applied to rubber plantations, this depends not only upon the different requirements of the rubber trees at their various ages, but also upon the condition of the soil. It is difficult, if not impossible, to lay down a hard and fast rule on this question. The amount per tree will vary according to its kind, age, &c, The amount per acre of plantation cannot be given with accuracy, as the number of trees planted in that area will vary in different plantations, or the trees may be planted closer together in some parts of the plantation than in others. For plantations on fair average soils, showing neither a marked excess nor a marked deficiency in any of the three fertilising ingredients—nitrogen, phosphoric acid and potash - the supply of plantfood may be considered well balanced if these fertilising ingredients are applied in the proportion of 1 part nitrogen, 1 to 1·5 parts phosphoric acid, and 1·5 to 2 parts potash; and therefore, for trees old enough to be tapped, which require about 40 lbs. nitrogen, 60 lbs. phosphoric acid and 70 lbs. potash per acre, the following mixture may be safely recommended to ensure good results:—1½ cwt nitrate of soda, 1½ cwt. oil cake 3½ cwt. basic slag (or 1½ cwt. concentrated superphosphate), 1¼ cwt. muriate of potash

" Where, however, plantations are laid out on poor soils, the above quantities should be increased by one-half; and a similar increase is advisable as regards the potash supply on light soils, whereas on strong soils—which are, as a rule, poor in phosphoric acid and lime—5 cwt. basic slag per acre will meet the requirements of the rubber tree better than either of the phosphatic dressings suggested above. Furthermore, if the trees show a good leaf growth, the nitrogenous dressing may be decreased by one-third, whereas if the leaf growth, is weakly, better results will be obtained by increasing the nitrogen supply one-third. As to the manuring of young plantations, the planter will be well advised to make use of the nitrogen collecting power of leguminous plants, which, grown between the rows, and forked in when they are in flower, are able partially to meet the young rubber trees' requirements for nitrogen. In order to enable the leguminous plants to develop vigorously, and to accumulate an increased quantity of nitrogen. it is, of course, necessary to manure them with phosphoric acid and potash, say, 2 to 3 cwt. basic slag and ½ to ¼ cwt. muriate of potash per acre. Such 'green manuring' may be practised as long as the growth of the leguminous plants does not hinder the roots of the rubber trees in their proper development. 'Green manuring' will not, however, supply all the nitrogen required, and a dressing of nitrate of soda must subsequently be given. When green manuring is not adopted. all the nitrogen has to be supplied by means of artificial manures. Young trees should receive, during the first year, a manuring with ⅜ oz. of nitrate of soda, ⅜ oz. oil cake, 1¼ oz. basic slag. or ¼ oz. concentrated superphosphate, and ⅜ oz. muriate of potash per tree. these quantities to be doubled from year to year till the trees are fit for tapping, when the full manuring suggested above may be adopted annually. The artificial manures are to be sprinkled around the trees. Until the young trees reach their fifth or sixth year, it is a better practice to manure them singly, by disturbing and forking in the manures around the stem, at a distance of from 1 to 1½ feet for each year of the tree's growth After the sixth year the soil of a plantation is so thoroughly permeated by the roots of the trees that the artificial manures can be distributed over the whole plantation."

The Planters' Chronicle.

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THE U. P. A. S. I.

(INCORPORATED)

Contents.

The Scientific Officer prints a valuable article on Compost with tables of two samples. Valuable as the article is, it is still more valuable if read in conjunction with the discussion that took place at the Annual Meeting last year, when the subject of leaching took a prominent place. This is referred to in the extract immediately following the first article.

The Planting Expert has supplied us with an article drawing special attention to the very interesting paper written for us by Dr. Leslie Coleman, on the subject of Fertilisation of Coffee. Though a digest, it assumes the value of an original article, and we hope to be favoured with more from his pen.

Then comes a valuable note on Scale on Tea, with the remedy for its extermination. Following this is an interesting note on various leguminous green dressings.

Our correspondence columns are taken up with some very interesting suggestions and information from Mr. King-Church and Mr. Rogers, both of whose letters have received attention and replies from the Planting Expert in the present issue. We hope that others will be encouraged to write to us *their* suggestions and of their experiments.

For the next article on Fertilisation in Coffee we are indebted to Dr. Leslie Coleman, and should prove of engrossing interest to all coffee planters.

A table of the returns of Exports and Imports of Coffee is given to show the state of the market and prices.

We reproduce from the "India Rubber World" a paper read by Mr. Cyril E. S. Baxendale, at the Third International Rubber Conference at New York, on the Plantation Rubber Industry, which is a history of Rubber from its infancy to its present high position, and will prove not only interesting reading, but being in a compact form, will make a useful reference. We shall conclude the article in next week's issue.

Scientific Officer's Papers.

CXX.—COMPOSTS.

At the Annual Meeting of the U. P. A. S. I. in 1912 some work on the study of Coffee Pulp and Composts was reported (*P. C.*, Vol. VII, p. 465). This work has been continued during the current year, and the following analyses show the composition of two composts made in the Bababudins at the time they were applied to the Coffee :—

		A		B	
		As received.	Ash.	As received.	Ash.
	Moisture	8·40		6·98	
	*Organic Matter	42·91		43·63	
Ash	Silica	31·23	64·13	22·27	45·09
	Phosphoric Acid	2·55	5·23	2·87	5·94
	Potash	2·38	4·88	2·86	5·79
	Lime	3·11	6·39	2·92	5·91
	Other Mineral Matter ...	9·42	19·37	18·47	37·27
		100·00	100·00	100·00	100·00
	*Containing Nitrogen	1·84		1·50	

The first (A) was composed of the following ingredients :—

		Rs.
2,000 bushels Cattle Manure costing	...	125
20 tons Whole Fish „	...	1,554
16 cwts. Sulphate of Potash „	...	172
2½ tons Bone Meal „	...	225
Labour for making	...	16
Rotal Rs.	...	2,092

It was made by putting down first a layer of 180 bushel baskets Pulp, 9 bushels of Bone Meal, ¼ bag of Sulphate Potash (⅓ cwt.), ⅓ ton of Fish, and 80 bushels of Cattle manure at the bottom of a pit. This was repeated till the pit was full, when it was allowed to rot down. It finally gave about 100 tons of Compost as applied and therefore cost about Rs.21 per ton. On its Nitrogen value alone, in terms of Castor Poonac containing 6% of Nitrogen and costing Rs,75 per ton, this compost is worth Rs.23 per ton, and if its Phosphoric Acid and Potash content are taken into account it is worth still more. Evidently there is a distinct profit in making the Compost, but it is really rather too expensive, and the same conclusion is arrived at as was formed last year, that the most profitable way of making a Compost, utilising pulp is to make it in connection with a cattle shed.

This was done in the case of the second sample (B). Here about 100 bushels of dry cherry husk were spread all over the floor of a cattle shed daily with two bushels of Bone Meal on the top. The Cattle were allowed to remain for the night in the shed, the dung and urine being well trampled and mixed with this husk and bone in consequence. This process was repeated for 15 days, when the shed was cleaned out and the mixture placed in an open pit. This was done constantly till the pit was full. The final result was the use of—

3 tons of Bone Meal costing	Rs. 285
Labour making „	„ 20
Labour removing from shed to Pit ...	„ 10
Total ...	Rs. 315

50 tons of Compost resulted at the end and thus cost about Rs.6—5 annas per ton.

The value of this Compost in terms of White Castor Poonac is Rs,18 12 annas. Hence there is a very large profit on the compost.

Composts made with ordinary pulp and line sweepings in a covered pit are also being experimented with again and will be reported on in due course.

RUDOLPH. D. ANSTEAD, *Planting Expert.*

The following is taken from the *Indian Planters' Gazette* and read in conjunction with the above article by the Planting Expert will be read with interest by those who make composts.

The fertilising constituents nitrogen, phosphate of lime and potash, and, we may add, magnesia, behave differently under the influence of an excess of rain. Phosphate of lime is not liable to be washed down in the soil beyond the reach of plants, as it is retained by the soil particles in various combinations. Similarly with potash, it is present in a form which protects it from the danger of draining out of the soil. Fortunately, the soil, possesses certain properties which enable it to retain the supplies of phosphoric acid and potash in the layers of earth to which the roots of the crops penetrate We have not, therefore, to fear in times of excessive rain, that any supplies of these constituents placed in the soil in autumn or winter will be lost or seriously diminished in their fertilising value for the spring crops. It is, however, different with nitrogen. All cultivated crops, with the exception of those belonging to the family of the leguminosae, which are capable of drawing their supply direct from the atmosphere, assimilate their nitrogenous element in the shape of nitrates, which are formed in the soil, or introduced into it by manures such as nitrate of soda, sulphate of ammonia, etc. In order to become available for plant food the nitrogen of organic manures, such as farmyard manure, dried blood, hoofs and bone meal, bones, etc , must first be subjected to decomposition in the soil, which converts the organic substances to nitric acid by the process known as nitrification. Any agency which hinders this beneficient process acts injuriously on the fertility of the soil. Excess of moisture and a low temperature act in this way. When the soil is saturated with water the air cannot penetrate it, and nitrification is impeded; but the injurious effect of the combined rains and cold is not limited to this point, but is exercised in a still greater degree by washing down into the subsoil the nitrate which may have been formed, and thus depriving the crops of this valuable constituent. It is very necessary, after wet weather, to make good this loss of nitrogen by the application of a fresh available supply, and for this purpose a small quantity of a concentrated nitrogenous fertiliser is especially advantageous.

THE SCIENTIFIC DEPARTMENT, U.P.A.S.I.

Fertilisation of Coffee.—The article on this subject which appears in this issue is of very great interest, and our thanks are due to Dr. Coleman for so kindly translating Dr. vonFaber's paper from the Dutch, and sending us a digest of it. The fact that Liberian and *robusta* coffees have two strings to their bow, so to speak, as regards fertilisation is most interesting, and that cross fertilisation is preferred to self fertilisation and provision made by Nature that the former should supercede the latter, bears out the contention put forward before in these pages, that the plant benefits by cross fertilisation, and it is not unreasonable to suppose that the quality of the beans produced by this process may be better than that of beans which result from self fertilisation, As Dr. Coleman says, this paper suggests a most valuable line of research with Arabian coffee, and further papers of Dr. von Faber's will be looked forward to with pleasurable anticipation by all interested in coffee.

Scale on Tea.—Specimens of Tea branches attacked by " Brown Bug," *Lecanium hemisphaericum*, have been received recently from the Nilgiris. This scale is a well known pest of Coffee, and it was discovered on Tea in India in 1895 by Sir George Watt. Green says that in Ceylon this scale is only dangerous under shelter from rain, but in India it occurs in open fields with no shelter.

The scales are usually found on the under surface of the leaves and on the twigs and shoots. The female scale on becoming fixed in position, inserts the sucking apparatus with which its mouth parts are supplied into the leaf or stem and extracts the sap. The result is that the plant is impoverished and ceases to flush.

The full grown scale is nearly spherial, of a pale chestnut brown colour and rather polished. When younger it appears as an oval scale with a marked longitudinal and two transverse ridges. The young larvae are active pale yellow insects which are capable of moving rapidly.

The remedy is to spray the affected bushes with Kerosine Emulsion. If the bushes are very badly attacked, it is advisable to prune them and burn all the prunings and then spray the new growth, if it again shows signs of the scale, the object being to prevent the spread of the pest by larvae being carried by wind to new areas.

Leguminous Green Dressings.—Experiments with different kinds of indigenous leguminous plants considered suitable for green dressings, are being conducted on several estates. A planter in South Mysore who has for many years been very interested in this subject and who has a large number of different green dressing plants under trial writes that *Tephrosia tinctoria* is the most easily established in his particular district. This is a very useful plant in Ceara Rubber and Tea. An analysis of it will be found in the *Chronicle* (Vol. VI. p. 542) and also an account of its use in Tea (Vol. V. p. 488). Next to this, *Cassia mimosoides* is good. The variety which grows in Mysore is a more upright plant with a looser growth than that found in the Nilgiris where it forms a mat, growing close to the ground. This is probably due to the difference in climate and elevation. The Mysore variety is probably the variety *Wallichiana* of Hooker's 'Flora of India.' My correspondent says he has carpets of it in his Ceará Rubber. He is also cultivating *Desmodium polycarpum* and leaving *Desmodium triflorum* wherever it appears though not keen on it. A number of others are on trial in the nursery and field, and will be reported upon from time to time.

R. D. A.

CORRESPONDENCE.

Tellicherry, 11th July, 1913.

Green Bug.

The EDITOR,
Planters' Chronicle,
Bangalore.

Dear Sir,—I have read with interest the articles and correspondence in your recent issues on the regrettable outbreak of Green Bug on some Estates in Mysore and Coorg.

Many and various theories are put forward to explain the presence of the pest in regions hitherto free from the affliction, but judging from the Scientific Officer's paper in your issue of the 21st June last, and from correspondence I have had with planters on the subject, a general concensus of opinion points to manure bags as at any rate *one* source of infection and the Scientific Officer is of opinion that they become so infected on the cart journey up to the Estates.

As a preventative against this specific source of infection in future, I venture to suggest that all bags of manure after being packed, might be thoroughly brushed over with a solution of such a nature as would render them unsuitable as a habitation to the Green Bug in course of transport.

The pest is of so dangerous a character, that I feel sure all parties interested in the coffee industry of Southern India, would willingly co-operate in any scheme calculated to ensure safety in the future from what at any rate appears to be one recognised source of infection.

Would the Scientific Officer kindly give his opinion as to whether the suggestion put forward would be effective, and if so, what would be the solution best suited for the purpose which, whilst being deadly to the Green Bug, would be harmless to the manure contained in the bags.

I may say in conclusion, that for my part, I should be prepared to treat every bag of manure as suggested before loading into carts to be taken up to the Estates.

(Signed) L. KING CHURCH,
Managing Partner,
Pullicoon Coffee Works Co.

Adderley Estate,
Coonoor, P. O., Nilgiris,
16th July, 1913.

To THE EDITOR,
Planters' Chronicle.

Dear Sir,—I have read with interest the recent correspondence on Green Bug.

I have been treating trees for Bug for some time, and have given both the spraying and brushing methods close ersonal attention. When I commenced I had 350 acres more or less affected, and the conclution I have come to is, that brushing is the only method that can be relied on to thoroughly eradicate the pest.

I have half a dozen "Four Oaks" sprayers and now only make use of these as follows: for spraying large trees bearing a heavy crop. and on any new patches of bug, where one spraying is given to check the bug until brushing coolies are available to go through and thoroughly treat each tree.

Up till quite recently I have used the sprayers without following up with brushing coolies, and I will give you the particulars of two fields treated this year, one with spraying, one with brushing.

In February last, I brushed a field of 5.000 trees at a cost of Rs.23 per 1,000 at the same time I sprayed a field of 2,000 trees at a cost of Rs.20·8·0 per 1.000 trees, these rates include labour and material. The latter field I sprayed again in May at about the same cost, and now I notice bug re-appearing on the ends of branches.

The field which was brushed in February, received no further treatment. Last week it was handled throughout, and after carefully examining the trees I could not find sufficient bug to give 10 coolies a day's work.

The mixture I use is as follows:—¾ lb. soap, 6 oz. rosin, 6 oz. refined saltpetre to 4 gallons water. In wet weather, I increase the quantity of rosin. The soap enables coolies to work up the mixture with a fairly firm froth, this sticks well to the leaves, and when dry, they have a decidedly whitish appearance. The advantage of this lies in the fact that a branch or leaf missed is very easily detected.

Brushes I make of good coir fibre, about 4 ins. thick and 6 ins. long. These do no damage at all to the foliage or crop and cost very little more than one anna each.

I would draw attention to the importance of first destroying any ants nests that may be found.

I always have a separate gang working just ahead of the brushes searching for and destroying ants' nests.

In conclusion I would remark that bug has been eradicated from all parts of the estate where I have been able to get at all the ants' nests, and I believe this is possible anywhere, providing the coffee has clean shade.

Yours faithfully,
(Signed) L. A. GERRARD ROGERS.

No. 585/1913.

Office of the Planting Expert,
Bangalore,
17th July 1913.

The EDITOR,
Planters' Chronicle.

Dear Sir,—The question of treating manure bags raised by Mr. King Church has been submitted to the Government Entomologist who has very kindly given his opinion. He writes, " a light spraying of the bags with rosin wash, crude oil emulsion, or any similar insecticide on arrival at the estate should be all that is required. I do not think, however, that you will keep out scale even if you fumigated the bags. The young are small and active and are doubtless carried by all sorts of methods ; foot passengers, possibly birds, &c."

The idea of treating the bags so that young scales falling on them would be killed, does not seem possible, but it would certainly be advisable in future for planters to spray bags on arrival.

Yours faithfully,
(Signed) RUDOLPH. D. ANSTEAD,
Planting Expert.

No. 590/1913.

Office of the Planting Expert.
Bangalore,
18th July 1913.

The EDITOR,
The Planters' Chronicle.

Dear Sir,—I am glad to see that your correspondence columns are eliciting so much valuable information about ' brushing *versus* spraying.'

I should be much obliged if Mr. Rogers would kindly inform us, firstly how many coolies he has brushing, and secondly how many trees they do per day on the average. I am quite aware that this depends upon the virulence of the attack of bug, but I want to know how many are done a day in the case of an ordinary average attack. This is important when dealing with estates and districts short of labour.

I find that on an estate in Coorg 300 to 350 trees a day can be sprayed lightly and 150 to 200 thoroughly by one cooly, and the cost is working out at 2/8 to 3 rupees per acre for two sprayings.

While on the subject I may mention that the Government Entomologist has called my attention to the fact that monohydrated sodium carbonate may be used with advantage instead of washing soda and only half the quantity is needed, washing soda containing ten molecules of water of crystalisation. I find that this monohydrated soda is sold under the trade name of ' Soda Ash ' and I have recently had a sample of this in my hands. It cost a rupee a hundred weight less than washing soda and half the quantity is required.

Yours faithfully,
(Signed) RUDOLPH D. ANSTEAD,
Planting Expert.

COFFEE.

Fertilization in Coffee.

With reference to the question of the cross fertilization of the coffee flower, a subject which has received considerable attention in the "Planters' Chronicle," it will, I believe, be of interest to give a short resumé, of some work that has been done on this question in Java.

In 1910, my friend Dr. F. C. von Faber published in Dutch some notes on the Biology of the Coffee Flower in which he gives the results of experiments performed by him on fertilization. He experimented with Liberia coffee and under Javanese conditions so that these results cannot be taken directly as applying to South India. They however suggest a line of investigation which might, perhaps, be profitably followed here in studying the question of the importance of cross fertilization.

Dr. von Faber first examined the question of pollination and found that out of 78 flowers of Liberia coffee examined, in all but 8 self-pollination had occurred in the bud before the flowers opened; moreover the pollen grains had in many cases, already germinated at the time of opening of the flower and the pollen tubes had begun to grow down through tissues of the style towards the ovaries.

From this result one might be tempted to conclude that, in the case of Liberia coffee, cross fertilisation can occur in so few cases as to be quite negligible. This is, however, not the case, as, on further investigation, Dr. von Faber found that, where pollen from other flowers on the same plant or from other plants found its way to the stigma and germinated, it grew about twice as fast as the pollen from the same flower. There thus occurs a sort of race between the foreign and the "self" pollen tubes as to which shall fertilize the ovaries and the results depend entirely upon how early the foreign pollen reaches the stigma.

Dr. von Faber has also some remarks to make on the rôle of insects in the fertilization of Liberia Coffee flowers. He states that, although the number of insects in a coffee plantation is usually small in comparison with the number of trees, this is to a certain extent equalized by the rapidity of insect movement, whereby a large number of flowers are visited in a very short time. Bees seem to have been among the most prominent insects observed by him. The following observations made by him are of interest.

6th April.—Tree No. 8—At 8 a.m. 48 flowers found open; within 15 minutes, 32 of these were visited by insects.

25th April.—Tree No. 7a—At 8 a.m. 72 flowers found open; within 25 minutes, 48 of these were visited by insects.

14th May.—Tree No. 15—At 8·30 a.m. 64 flowers found open; within 45 minutes, 52 of these were visited by insects.

14th May.—Tree No. 18b—At 10·30 a.m. 38 flowers found open; within 15 minutes, 24 of them were visited by insects.

The visiting insects were, in each case, examined and were found invariably to be covered with pollen.

The paper under reference also contains an account of observations on the *robusta* varieties of coffee, where it was found that self-fertilization in the bud rarely takes place. The auther found here also that foreign pollen grains grow more rapidly down through the tissues of the style than do the "self" grains.

With regard to Liberia coffee the author concludes that cross fertilization was the original method and that self-fertilization has arisen later to guard against failure in fertilization.

As far as I am aware, no similar studies have been made on *Coffea arabica* either in India or elsewhere and it would, I believe, be a matter of considerable practical interest to ascertain whether a difference in the rate of growth of foreign and "self" pollen grains exists here similar to that described by von Faber for Liberia coffee in Java.

The paper under review is a preliminary one, and I hope to receive soon from Dr. von Faber a paper dealing with the subject of the fertilization of coffee in a more extensive manner. Any further facts of general interest will be communicated to the *Planters' Chronicle*.

(Signed) LESLIE COLEMAN,
Director of Agriculture, Mysore.

COFFEE.

The terminal market has been very unsettled, and after sharply advancing 1*s*. 6*d*. per cwt. a considerable amount of selling from abroad sent prices down again. A larger business than usual has been done and closing prices show a decline of 2*s*. 3*d*. per cwt. from the highest point of the week. Until yesterday the pressure did not apparently come from Brazil, but heavier daily receipts produced weakness, and lower offers were made. Quotations are now much lower than the principal operators had expected, and the general opinion is that the fall has been overdone, and is mainly due to the financial difficulties in markets abroad other than Coffee. The fall has certainly given more confidence, and a fairly large business has been done at the lower rates. Unless the new crop is hurried forward more rapidly than usual an advance seems probable, as dealers are generally short of stock. Mild descriptions have been almost entirely neglected, and to effect sales importers haye had to accept a reduction of 1*s*. to 2*s*., but in many cases they have preferred to withhold their offerings, so that quotations are not in all cases much lower.

LONDON COFFEE RETURNS.

	Home Consumption.		Export.		Stock.	
	1913. Tons.	1912. Tons.	1913. Tons.	1912. Tons.	1913 Tons	1912. Tons.
For week ended June 7 ...	298	241	652	5	16,409	13,667
For 23 weekks ended June 7 ...	7,277	7,289	8,371	8,297	—	—

OFFICIAL STATISTICS OF THE COFFEE TRADE OF THE UNITED KINGDOM.

	1 month ended May 31.			5 months ended May 31.		
	1911.	1912	1913.	1911.	1912.	1913.
Imports ...cwts.	50,159	66,655	72,440	419,338	420,704	476
Home Consumption ...cwts.	31,436	24,157	32,750	114.853	119.672	120
Exports ...cwts.	217,098	37,359	45,484	369,832	203,422	171
Total Deliveries. cwts.	248,534	61,516	78,234	484,685	323,094	291
Stock on May 31. cwts.	380,000	313,000	346,000	—	—	—

—*The Produce Markets' Review.*

RUBBER.

The Plantation Rubber Industry.

by

CYRIL E. S. BAXENDALE.

A Paper Read at the Third International Rubber Conference, held in New York, 1912.

EARLY HISTORY.

It is remarkable that—as civilization has become dependent on cultivated produce—the profitable cultivation of rubber should have been, for years, open to doubt.

It was in 1876 (not less than 36 years ago) that *Hevea* seeds were brought from Brazil to Europe by that prince of smugglers Mr. H. A. Wickham. There was an earlier attempt, but as the few seedlings raised all died, we need not waste time over that. From the 70,000 seeds collected in Brazil by Mr. Wickham, 2,800 plants were raised at Kew Gardens (London) and, in the same year, shipped to the Perideniya Gardens of Ceylon (Ridley tells us) as a depot for the plants from which the cultivation might be spread all over those British Colonies wherein the plant could thrive.

In 1877, a case of 22 plants reached Singapore and were successfully planted by Mr. Murton, the then curator of the newly founded Botanic Gardens there. The same year the first *Hevea* trees arrived in the Malay States. Two cases were sent from Ceylon to the late Sir Hugh Low (British Resident of Perak) who planted them at Kwala Kangsar, and, I am glad to say, he lived long enough to see something of the great success of the industry that he helped to found.

It may seem strange that these trees reached maturity many years before it was realized that they were capable of yielding a sufficient quantity of rubber to make their regular tapping profitable. The only explanation I can offer for this is that the duty of tapping them was relegated to Sakeis (Malayan Aboriginals), who adopted the same method they applied to the collection of wild rubber; that is to say, they hacked them with choppers, while the results they achieved were insufficient to tempt any capitalist to put ten cents into the business.

It is to our scientist friends that we owe the primary knowledge of how these trees might be made profitable. On what we now consider to have been a red-letter day in the year 1888, Mr. H. N. Ridley was appointed Director of the Botanic Gardens in Singapore and very soon afterwards commenced experimental tapping: but it was not until 1891 that the first sample of plantation Pará was sent to London from Malaya and was favorably reported upon by experts. During the nineties, several gentlemen in Ceylon, and Mr. Derry and my learned colleague, Mr. Leonard Wray, in Malaya, continued the experiments.

The first actual sale recorded from Malaya was in 1899, from the trees planted by Sir Hugh Low, and realised 3*s*. 10*d*. a pound. The trees were then 22 years old. To the brothers Kindersley belongs the honor of first planting rubber on a commercial scale in our country. That was in 1895, and within three years the late Mr. W. W. Bailey and several other planters, including the humble individual now addressing you, had summoned up sufficient courage to plant a few hundred acres amongst them. To attribute this slow development to lack of enterprise would be unjust. If any explanation is required, it must be attributed to lack of money. At the time of which I am speaking, we were all coffee or sugar planters, struggling for a bare, very bare, existence. Some of us may have had the privilege of being on terms of a nodding acquaintance with men of means, but not many of those could recollect that rubber was useful for any practical purpose, except for the erasure of pencil marks.

A favored few had seen or heard of a Mr. Charles Rolls, travelling in a horseless carriage preceded by an ancient man on foot, carrying a red flag as a danger signal; but, probably, none of these realised that this object of merriment was the forerunner of the greatest mechanical industry of the age, or if they did, would not, at an rate, have found it a reason for supporting the schemes of would-be rubber planters.

Rumours of remarkable results from the first planted *Hevea* trees of Ceylon and Malaya reached Europe, and as the years rolled on, a few speculative—or may I call them, far-sighted—persons staked a portion of their savings on the new venture,

The extension of the area under *Hevea* in Malaya, which in 1905 amounted to about 38,000 acres, increased at an average rate from that year of about 70,000 acres per annum. The total area at the end of last year (1911) was 542,877 acres.

THE BOOM.

During 1909, the income from the older companies attracted the attention of the investing and speculating public of Europe in general—and Britain in particular—as being unusually large for an agricultural industry. At the same time the value of crude rubber went up by leaps and bounds, bewildering even to those in it. Speculation was indulged in, of which the promoter of many a wild-cat proposition took full advantage.

It is said that the boom far exceeded that which heralded railway development 70 years ago and can only be compared with another that occurred in the reign of our late Queen Anne in connection with a venture known as the South Sea Bubble.

Well, *our* Bubble, has since deflated somewhat, I am glad to say, but it has not burst; and I think it may be said that the planters who had borne the burden and heat of the day generally kept their heads in spite of the somewhat embarrassing attention paid to their humble efforts, and this had much to do with steadying the market when the bubble was soaring, and also in stopping total deflation when investors rushed to the other extreme.

CLIMATIC CONDITIONS.

The reason the Malay Peninsula attracted most attention for this purpose was, primarily, its regular rainfall. It is commonly said that there are two seasons in that country. One is the wet, and the other is the d—d wet season.

This peculiarity is due to its unique situation as the meeting place of N-E Monsoon of the China Sea and the S-W Monsoon of the Indian Ocean. After the subsiding of the rains of the S-W Monsoon, the N-E commences and as the width of the Malay Peninsula does not exceed 170 miles in any part, the land on both coasts is affected by either monsoon.

I have kept the rainfall records at Jugra for 11 years and have never experienced a month without rain, and rarely a month below the average rainfall of Britain. It must be admitted that some of us, in cabling particulars of our monthly outputs, explain a shortage against the estimate by adding " owing to the drought "; but the truth is, we have yet to experience the true meaning of the word " drought." There are very few days in the year when it is too wet to work, and this, of course, gives us a great advantage over the collector of wild rubber on the Amazon, where I understand there can be no tapping for several months of the year,

HEALTH.

A very considerable change has come over the conditions of life in Malaya. I regret to say that many of the plantations can hardly yet be described as health resorts; but there has been an immense improvement, and in view of the more or less recent discoveries of our medical men, there is good reason to hope that the improvement will continue. To Sir Patrick Manson and Professor Ross we owe the original discovery that the *Anopheles* mosquito is the principal, if not the only, carrier of malarial infection, and the doctors of Malaya have amongst them done excellent work as a result of this discovery. I would single out Dr. Malcolm Watson for special mention, as his work as medical adviser to plantations has come particularly, under my notice.

He has discovered that the variety of *Anopheles* which favours the coast districts, rarely, if ever, travels more than one-half a mile from the jungle, and there is practical immunity in dwelling places at this distance.

The valleys, in some of the inland districts, harbor another variety of the *Anopheles* the spawn of which can exist in running water, and can only be got rid of by carrying the water away in enclosed drains. Interesting experiments in this direction are now being carried out by several rubber companies in Selangor.

Thanks to the natural richness of the soil, a considerable amount of capital was attracted to British Malaya from Ceylon, where there was comparatively little suitable land available, and our community owes some thing of its success to the cash and experience introduced from that colony.

GOVERNMENT AND PLANTER.

Although the new aplications for land are still sufficient to tax severely the resources of our over-worked (and not over-paid) Survey Department, the increased rent and export duty has driven a certain amount of British capital to the Dutch Colonies of Java and Sumatra, and considerable development has recently been made in those islands, as well as in Borneo.

When stating these facts, I do not wish it to be understood that I am advocating the avoidance of British Malay as country for investment, or that I would belittle the fine work accomplished by my fellow countrymen who have been officially responsible for the development of that region.

On this occasion, I have the honor to represent the Planters' Association of Malaya, who amongst them manage a total of upwards of 600 plantations, with an invested capital of about fifty million pounds sterling, a value, which through their efforts, has appreciated to several times that amount. I am quite certain that I should not be correctly voicing that community if I conveyed the impression that we would prefer any form of Government than that approved by our Sovereign Lord, King George.

The success of our industry is largely due to the confidence inspired by the existence of an absolutely honest and conscientious public service. Mistakes have been made, but these have been due, entirely, to the excessive zeal of those in authority, who desire that the whole country should participate in the prosperity of our industry; and judging by past experience in times of adversity, we may reasonably expect that if our burdens become too grievous to be borne, we shall obtain the relief necessary to meet the stress of competion.—*The India Rubber World.*

(*To be continued.*)

The Planters' Chronicle.

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THE U. P. A. S. I.

(INCORPORATED)

Contents.

Mr. Jonas, Scientific Assistant, Coorg, has arrived at Headquarters, and will probably remain in Bangalore for the next three weeks. He is occupied in laboratory work.

Pressure of space has prevented the continuation of the interesting paper on Rubber, read by Mr. Baxendale, in this week's issue, but we hope to continue it next week.

To the *Weekly Times of Ceylon*, we are indebted for a valuable contribution on the subject of Dynamite in Planting. More light is gradually being thrown in this subject more especially on the point of cost per acre.

Our correspondence columns are fuller than usual of matters interesting to the Planting Community, and the subjects mentioned in the various letters are sure to come up for serious discussion at the next annual meeting, which is fast approaching. Though all the letters are interesting, the Editor considers that written by South India as the most important and deserving of special attention by all planters, for the subject matter of it is bound to receive the serious attention of the delegates at the coming conference.

The interview with Mr. Petch, as taken from the *Times of Ceylon* should prove interesting to all Tea and Rubber Planters.

For the Coffee Planting Community, we publish a short history of coffee taken from the *Produce Markets' Review*, from its first introduction.

The Chairman has written to the Secretary and asked him to let it be known, that the postal deliveries round Meppadi have been disorganised through the illness of the Postmaster, and consequently some unavoidable delay has taken place in receiving and answering letters. This especially applies to Telegrams and registered letters that may have been addressed to him.

To all those who have kindly consented to support the coming Exhibition, the Secretary through the Editor, wishes it to be known that samples of different products should not exceed one pound each, packed either in lead lined packets, or wooden boxes. As we hope to have a tasting competition, these samples should be drawn from Invoice samples.

DYNAMITE IN PLANTING.

Demonstration at Matale.

Mr. Thos. J. Doolan, representative of Nobel's Hamburg Explosives Co., Ltd., gave a demonstration in the use of dynamite as aid to planting on Wariapola Estate, Matale, on Sunday and Monday, in the presence of Mr. J. A. M. Bond, the Superintendent, and a number of planters from the surrounding country. Mr. Doolan took a rubber section of about 1¼ acres, in which he put down 100 holes of an average depth of 21 inches each in 20 minutes' time with three coolies at the work. The charge used was half a plug of Nobel's Hamburg dynamite No. 1 for each hole, which worked out at 10 cents a hole, or Rs.10 per acre. The time occupied in putting down the holes, making and preparing the charges, charging the holes and the firing, until the last charge went off, was two hours. The ground, which was an unplanted section of the rubber plantation, was a fairly hard gravelly loam. Mr. Doolan also blew off a tree stump, about 2 feet in diameter, using four cartridges, which cost 50 cents. He also blasted several rocks, and one large boulder of about 25 tons at a cost of 75 cents, without any drilling. The boulders were completely shattered, and the spectators were surprised at the result. An important matter was also the destruction of ant-hills. Some enormous ones were completely shattered. One termite hill 6 feet high and wide in proportion was destroyed at a cost of about 25 cents. The explosion besides shattering the ant-hill also killed the greater part of the insect inhabitants. Mr. Doolan says that it will be an absolute waste to use full cartridges for sub-soiling, breaking hard pan, and digging holes for tree planting. Half a cartridge, or one-third of one, according to conditions obtaining, is quite ample.

AN ESTIMATE OF COST.

Mr. Doolan has worked out an estimate of cost of blasting with Nobel's Hamburg dynamite, which is interesting for purposes of reference. A case of dynamite cartridges weighing 25 lbs. and containing 200 cartridges ⅞ inch in diameter would cost about Rs. 24, equivalent to 12 cents per cartridge. Detonators cost Rs.19·50 a thousand, practically 2 cents each, and the fuse costs about a cent a foot. For general work, half a cartridge costs 6 cents, detonator 2 cents, and 2 feet of fuse 2 cents, making a total of 10 cents per hole. To this has to be added the cost of cooly labour, which works out at a cent a hole, so that the total cost of a hole is 11 cents. Of course the advantages in labour saving and ensuring the best growth and better yields through planting in dynamited ground are considerable—advantoges which are now well known.

IN TEA PLANTING.

In the matter of tea planting, where a large number of plants go down to the acre, Mr. Doolan recommends placing one third of a cartridge 12 feet apart in any direction, which would be quite ample. There is no necessity, he states, to blow out a hole for each tea plant, but the dynamiting of the land in the manner just stated, was all that was required. In the matter of tea planting the cost would be small, one-third of a cartridge working out at 4 cents, the detonator at 2 cents, and 15 inches of fuse at one cent, making a total of 7 cents for each charge placed 12 feet apart.—*The Weekly Times of Ceylon.*

CORRESPONDENCE.

Government of India,
Legislative Department.

From

The Hon'ble Sir W. H. H. Vincent, Kt.,
Secretary to the Government of India,
Legislative Department.

To

The Secretary,
United Planters' Association of Southern India.

Simla, the 16th July, 1913.

Sir,—In reply to your letter dated the 25th June, 1913, I am directed to inform you that it is proposed to introduce a Bill for the Prevention of the Introduction of Pests and Diseases into India in the Council of the Governor-General during the next autumn sessions. A copy will be sent to to you after its introduction.

I have the honour to be,
Sir,
Your obedient Servant,
(Signed) W. H. VINCENT,
Secretary to the Government of India.

Hallery, Mercara P. & T. O.,
N. Coorg.
July 17th, 1913.

THE EDITOR,
Planters' Chronicle,
Bangalore.

Dear Sir,—This letter is intended as an attempt to stir up the Planting Community to demand the rebates paid by the shipping companies on freight from the Malabar Coast.

At present I understand that a thing called the "Malabar Coast Chartering coalition" takes the rebates and this is but another name for the Curing Firms themselves. If this statement is not correct I have been misinformed, and am prepared to withdraw it.

In any case the Planter pays the freight and is entitled to any rebate thereon.

There is a letter extant, dated in 1894, to the Secretary, U. P. A. on a kindred matter.

Yours faithfully,
(Signed) JOHN A. GRAHAM,

North Mysore Association.

Dear Sir,—With reference to the report of this Association's Third Quarterly Meeting held on June 3rd at Balehonur.

Madras Act No. I of 1903—Mr. Danvers' proposal is reported as *Carried unanimously.* Owners and managers on leave reading this report would naturally suppose that all those present at the Meeting voted in favour of the proposal—this was not the case.

As I have been asked why I voted for the proposal, I beg to state that I was one of those who did not vote for or against, my reasons being

(1.) I had no instructions from absent owners and managers I was representing.

(2.) Proposal was not on Agenda.

Yours faithfully,
(Signed) R. G. FOSTER.

Dear Sir,—I consider the subject on which I write will be the better for airing.

Two days since I had Lists of Manures from 2 separate S. Indian Firms: but they've both omitted any Prices. A new thing. It seems to me they are asking for correspondence with the planter, and few planters find correspondence with Agents a profitable employment.

One Firm at all events has prices attached to their own numbered Fertilising Mixtures, which I can only conclude cover any possible rise of Prices in the ingredients: however good they may be. This novelty was not produced for the Planters' good—certainly not. Added to this the harmless pastime of making our own mixtures for our own pockets has been taken away.

I trust some of your readers with the Business brains, or else yourself, will offer an explanation; for myself I admit.

I am,
STYMIED.

THE EDITOR,
The Planters' Chronicle,
Bangalore.

Dear Sir,—I have been reading with great interest your Bulletin No. 2 giving articles and letters bearing on labour matters, a copy of which should be in the hands of every planter in Southern India.

With the usual lack of interest however in anything outside the boundaries of our own Estates, its very existence, except to a few, is probably, unknown, My chief reason for writing this letter was not on account of the above mentioned Bulletin, but in your introduction, you mention several points which more or less touch on my subject.

I should first of all like to make a few comments on these.

In para. 2 you say "It is very doubtful if Legislation is required. Would it not be better for the community to work out its own salvation and only ask the Government to countenance a scheme which has received the general support of the U. P. A. S. I.?"

I sincerely wish I could agree with you in this, but I am afraid that it has been too clearly proved for years past, that combination amongst the Planting Community of Southern India is beyond hope, and nothing short of Government Legislation will bring it to its senses.

As a proof of this, we have only to look at the results of the various Labour Committees appointed by the U. P. A. S. I. during the last four or five years.

The members of these Committees have worked hard, and various schemes have been brought forward, but their labours have been all in vain and wasted for one reason only, and that is want of combination.

PARA. 3.—"The Registration Scheme of Finger Prints which has for some time been before the District Associations, appears too costly for the Association to take up and put into practice on its own account and has not elicited useful suggestions to aid the sub-committee in solving this question."

In this you draw attention to the Registration Scheme of Finger Prints which is one of several schemes recently proposed.

Registration of some sort is a step in the right direction, but what good will it be to us, unless we have some law to enforce the Estate or Company to give up twice advanced or bolted coolies when they have been traced and identified.

PARA. 4.—You say here that "The Malay States appear to have solved the question of labour for themselves and that the two prospectuses published should give much fruit for reflection." In this I quite agree with you, and if the Planters of Southern India were not all asleep or too intent on their own individual interests, they would have recognised the result of their present policy long ago.

In the same para, you go on to say that "Ceylon is following suit, and the whole matter resolves itself into one of competition, and inducements to the Indian labourer to emigrate" and I think the enclosed advertisements, which were my real reason for this letter, amply bear this out.

One of these fills about a third of a page of the *Times of Ceylon* and appeared for some days. The cost of this alone must have been considerable, and naturally would not have been incurred unless the Superintendent had some legal remedy.

NOTICE.

THE UNDER-MENTIONED COOLIES having given notice to this Estate, have left without settling their just liabilities and dues. Anyone wishing to employ under-mentioned Coolies is requested to communicate with me before taking them on:

Name.	Age.	Sex.	Race and Caste.	Village.	Taluk.	District.
			Tamil.			
Periasamy	18	M	Padayachi	Vellore	Namakal	Salem
Armogen	20	M	do	do	do	do
Ponganen	21	M	do	Omapatty	Karoor	Trichinopoly
Kaliama	17	F	Barber	Paramathy	do	do
Natchiama	18	F	do	do	do	do
Marudaie	25	F	Padayachi	Poayan	Namakal	Salem
Veerapen	12	M	do	Vellore	do	do
Parawithy	23	F	do	Idayar	do	do
Sittan	6	M	do	do	do	do
Mauri	27	M	Palla	Pakawalayam	Karoor	Trichinopoly
Mottayan	10	M	Vellala	Norjil	do	do
Sinnappen	47	M	do	Valliarasal	Erode	Coimbatore
Ammani	28	F	do	Komapatty	Karoor	Trichinopoly
Vadavail	19	M	Padayachi	Vellore	Namakal	Salem
Papai	30	F	Sakkili	Edian	do	do
S. Mcoken	20	M	do	Chettyapalayam	do	do
Thiraman	19	M	Malayali	Kottamally	do	do
Valiama	13	F	Padayachi	Vellore	do	do
P. Kavanden	32	M	Kavanda	Pillopallayam	Athoor	do
Ramasamy	12	M	Padayachi	Vellore	Namakal	do
Nallappen	27	M	Vellala	Tathancotta	Karoor	Trichinopoly
Muthan	32	M	Malayala	Kolliwali	Namakal	Salem
Marthamuttu	28	M	Padayachi	Aricumpalayam	do	do
Ramai	22	F	do	Kathampalayam	do	do
Vengatama	25	F	Wadagu	Periakulam	Madura	Madura
Mutusamy	20	M	Sakkili	Natchipuram	Kallayalam	Musiri
Armogen Mudaly	23	M	Mudali	Kathanpalayam	Nadoor	Trichinopoly
Mariai	9	F	Pariah	Nadoor	do	do
Ellama	26	F	do	Pallicanande	Arcot	Arkonam
Padaman	18	M	Padayachi	Pawpody	Karoor	Trichinopoly
Sinniah	26	M	Sakkili	Nadenoor	do	Coimbatore
Natchie	28	F	do	do	do	do
P. Ramai	40	F	do	do	do	do
Kolenduvail	22	M	Padayachi	Kadamankuruchy	do	Trichinopoly
Ramen	25	M	Otta	Kudaloor	do	do
Kamatchi	30	F	Vellala	Vellore	Namakal	do
Serangun	22	M	Sakkili	Nedungoor	Karoor	do

Name.		Name of Kangany.	Height.		Colour.	Distinguishing Marks.
Father's	Mother's		ft.	in.		
Perianen ...	Marudai	Periasamy	4	9	Dark	Birth mark on ear
Karpa Kavenden ..	Thandai	do	5	4	Medium	Tattoo on forehead
Karrupenan ..	Veerakka	do	5	5½	do dark	Scar on right wrist
Sidamporam ..	Pasupathy	dd	4	11¾	Dark	Tattoo mark on forehead and back
Marthan ...	Marthai	do	4	11¾	do	Scar and tattoo on forehead
Marthumuttu ..	Mariai	Perianen	4	10	do	Tattoo on forehead
Perianen ..	Marudaie	do	4	3	Medium	Wart on eyelid
Marudan ..	Veerama	do	5	1	Dark	Small-pox marked
Nanchan ...	Parawithy	do	3	7½	do medium	Scar on right cheek
Marthen ...	Athiriy	do	5	8½	Dark	Scar near left knee
Sengoden ..	Poochaye	do	4	8¾	do	Scar on back
Perianen ...	Coopaye	do	5	3½	do	Scar on right upper arm
Ramasamy ..	Natchyama	do	4	11⅓	do	Scar on both hands
Perianen ...	Marudai	Vadavail	5	0	Fair	Pock marked face
Rengan ...	Carpai	do	5	6	Medium	Tattoo on forehead
Muthan ..	Veerama	do	5	3	Dark	Mole on nape of neck
Padian ...	Chunche	do	4	10⅛	Medium	Nil
Canagasaba ...	Sinama	do	4	10½	Dark	Tattoo on forehead
Seerangam ...	Sellama	do	5	6¾	do	Scar on forehead
Velayuden ..	Angama	do	4	2¼	do	Marks on chest
Seerangam ..	Carpai	do	5	8½	do	Scars on forehead
Chinan ..	Carpai	do	4	9½	do	Scar on left cheek
Perianen ..	Marudai	Marthamuttu	5	5	Medium	Pock-marked face
Ramasamy ...	Marudai	do	5	0	do	Tattoo on forehead
Ramasamy ...	Awadayama	do	5	6	Fair	Tattoo on head and arms
Veeran ..	Veerai	do	5	0	Dark	Marks on face
Mari ...	Palaniaka	do	5	5¾	do	Small scar on back
Pandaram ...	Arai	do	4	7	do	Tattoo on both forearms
Munian ..	Kali	do	5	1¾	do	Pock-marked face
Kululakaran ...	Seilai	do	5	3	do	Scar on back
Sangaran ..	Seerangi	do	5	1½	Dark	Birth marks on arms
Ramen ..	Nala	do	5	3¼	Medium dark	Scar on forehead
Mutusamy ..	Natcha	do	4	11	Dark	Birth mark on right leg
Palanyandy ..	Sembai	do	5	4	do	Scar on back right jaw
Veeran ...	Marah	do	5	5¾	do	Scar on lower and right forearm
Sellalooty ..	Carupaie	do	4	10¾	do	Tattoo forehead
Pallany ..	Veerai	do	5	6¼	Medium dark	Scar on forehead and back of upper arm

(Signed) H. G. GREIG,
Superintendent, Illabbaluwa Estate,
RATNAPURA.

BOLTED.

A REWARD OF RS. 100 IS OFFERED FOR IFORMATION RESPECTING THESE 8 COOLIES.

	NAME.	AGE	SEX.	RACE & CASTE.	HEIGHT.	COLOUR.	DISTINGUISHING MARKS.	GENERAL APPEARANCE.
1	Kandasamy Kangany ...	33	Male	Tamil Ambalacaren	5' 4¾"	Medium	Scar and tattoo line on forehead	Ordinary
2	Callien ...	22	,,	,, Vanniya	5' 3¼"	Dark	Scar left side of nose & left side of chin	,,
3	Murugen ...	16	,,	,, Ambalacaren	4' 6¼"	,,	Right nose bored	Sickly
4	Superamanien ...	8	,,	,, ,,	Short	Medium	—	—
5	Meenachie ...	12	Female	,, ,,	4' 2"	Dark	—	Ordinary
6	Vellachie ...	13	,,	,, ,,	4' 3½"	,,	Scar on forehead	,,
7	Ponnamma ...	27	,,	,, ,,	Tall	Dark	—	Well-made
8	Mookaie ...	30	,,	,, ,,	5' 1¾"	—	Scar on left forearm	Ordinary

and FOUR CHILDREN from ages 2 to 6.

SUPERINTENDENT,
Nilloomally Estate,
MADULKELLE.

(Anglo-Ceylon & General Estates Co., Ltd.)

The head lines of the advertisement must make the planters of South India smile.

Over here, it seems to be, everyone for himself and the devil take the hindmost, and a very good example of this is quoted in the minutes of the last Nilgiri Planters' Association, but in this particular case it only happened to be 5 coolies whereas I have heard cases of 30 to 50 coolies being taken very much the same way. It is to be hoped the perpetrator in this Nilgiri case may be shown up, but beyond this, the sufferer has no redress and the culprit smiles up his sleeve.

To go into the details of the advertisement, we find an accurate description not only of the Kangany but every individual cooly from which they should be easily traced, and when as in Ceylon you have legal remedy for redress, a scheme of this sort is essential, but as we are situated in Southern India at present, expenditure on registration schemes in my opinion is simply a waste of time and money.

PARA. 5.—In this you go on to warn the South Indian Planter of the help the Indo-Ceylon Railway will be to Ceylon recruiting, but I think you have hit the right nail on the head when you recommend more advertising. Here we are in Southern India the home of the coolies who work practically all the coffee, tea and rubber plantations in the East, and we allow all those outside our own country to flood our labour Districts with posters and distribute broadcast, leaflets, describing the advantages to be gained by coolies leaving their own country to work on these Estates.

What are we doing in Southern India? Absolutely nothing. but hurrying on our own ruin. We sit still, not because we are content, but because of petty jealousies. We can't agree amongst ourselves.

Ceylon played this game, because she thought she was close enough to her labour never to run short, and when it was too late went for legislation, and has landed in a quagmire of coast advances from which she can never recover without a tremendous loss, which will open the eyes of many Directors and unsuspecting Share-holders some day.

South India is rapidly drifting in the same direction, but there is still time for escape, if we can only pull together, As you rightly say at the conclusion of Para. 4, the whole matter resolves itself into one of competition and inducements to the Indian labour to emigrate,

After all this rigmarole, you will no doubt ask me what I propose as a remedy.

Firstly, I would advise advertisement. Nothing succeeds now-a-days without advertisement, and we must wake up and march with the times.

Any one can make a pill, and provided it has nothing injurious in it. you may recommend it to cure every disease under the sun, and provided it is sufficiently advertised it is 100 to 1 on its sale proving a success.

In Southern India we have no fear of putting anything injurious in our cure.

We have conditions equal to anything that can be offered elsewhere.

The cooly is near his home and is never bound for more than 9 months to a year, and with out low capital cost per acre compared with the majority of Estates in other planting countries, we should be able to offer the same if not better inducements to the cooly to work for us instead of emigrating, I would flood the country with advertisements through the U. P. A. S. I. giving without favour a description of, and conditions prevailing in, each District.

It will cost money, but I am confident it will pay us and carry us on for a time.

My second recommendation I know will bring down on me a storm of abuse, but I can see nothing else for it but Government Legislation.

We have already proved ourselves incapable of "working out our own salvation" as you put it in your introduction to your labour Bulletin.

Wherever you have active and keen competion in whatever business you like to mention, there is the temptation to run off the straight, and which unfortunately has been proved to exist amongst the planters of Southern India, and in my opinion nothing short of Government interference will stop it. That legislation will come sooner of later, there is little doubt. as the Government of Madras and the Native States in South India also feel the pinch in getting labour for the Public Works and will be forced to move in the matter before long.

I think the Nilgiri Association's proposal of a commission to go into the labour matter a good one, but it should consist of representatives of all employees of labour European, India and Government, if it is to do any good.

I must apologise for taking up so much of your valuable space, but the matter is of such vital importance to our industry, and the yearly meeting of the U. P. A. S. I. is shortly to take place, when labour matters will no doubt occupy a considerable part of its time, I must ask your indulgence.

Yours faithfully,
SOUTH INDIA.

Bangalore, 23rd July, 1913.

A NEW METHOD OF FERTILIZING THH SOIL.

A new method of appiying chemical fertilizer to fruit trees is proposed by M. Cadoret, and he finds that it gives much better results in experiments which he has been making in France. The usual method is to simply spread or strew the chemical fertilizer on the ground at a certain distance around the trunk of the tree, but it is found that this has a disadvantage in that the fertilizing principles do not penetrate into the ground as rapidly as might be supposed, so that their action is felt but slowly. M, Cadoret finds that a much better plan is to use an iron rod having an expanded part near the point so as to make rather large holes in the ground. Such holes are filled with the fertilizer which consists of a properly prepared mixture using some precautions. The fertilizer, in order to prevent damage to the roots from the caustic action, should be mixed with crumbled earth beforehand. From four to six holes should be used, deep enough so as to contain all the fertilizer required for the tree in question, and the holes are best placed about 12 inches from the trunk. The depth of the holes is increased to keep pace with the growth of the tree. According to M. Cadoret, the above method gives remarkable results, and he finds that peach, apricot, cherry, and other trees of five years' growth are as well developed as other trees of twelve years. The method has the advantage that it does not imply extra cost. Two men can treat eighty trees a day in this way.

TEA.

The Root Diseases.

The *Times of Ceylon* publishes an interview with Mr. Petch, the Ceylon Government Mycologist, on the subject of a root disease of Tea known to science as *Botryodiplodia theobromae*. There is nothing in this interview which has not been published before, but it may be of interest to Tea and Rubber planters to refresh their memories about this disease. Mr. Petch is reported to have said that they had known *B. theobromae* for a good many years, more especially in the low-country. It was discovered after pruning. Of course the disease attacked the bushes some time previous to pruning, but it, apparently, was able to exist in a more or less dormant condition. It was also to be found at other times.

Speaking of the spread of the disease. Mr. Petch said that it had become rather extensive in one or two cases where *Albizzia* trees had been cut down and the stumps left in the ground. "It is a very common fungus," added Mr. Petch, "which, beginning on *Albizzia* stumps, spreads to tea. It will also grows on dead rubber and cacao, cocoanut, dadap, and the papaw, but, as far as we know, it only causes root disease in tea and in rubber, where it continues the 'die-back,' which is initiated by another fungus (*Glaeosporium Alborubrum*), It differs from the other well-known root disease of tea, *Rossellinia*, in that it spreads, practically, only by means of spores. There are no underground threads."

Asked as to whether the disease might be considered serious, Mr. Petch remarked that it was thought likely that the disease might be serious in the low-country some years ago, because the fungus developed on buried prunings, in the low-country districts at any rate, and several estates which made a practice of burying prunings every few years, were badly attacked by the disease. The diseased bushes, said Mr. Petch, should be burned because they

PRODUCED MILLIONS OF SPORES

as they dried up. When a tea bush was killed by the disease, the roots were completely filled with mycelium of the fungus. Mr. Petch recommends that the dead bushes should be uprooted and burnt without delay, and any prunings lying about the place, should be raked up and similarly destroyed; while the affected soil should be forked over with quicklime,

CONNECTION WITH RUBBER.

As regards *B. theobromae* attacking rubber, Mr. Petch makes reference to it in his valuable work on "The Physiology and Diseases of Hevea Braziliensis." After the death of the leading shoot from "Die-back," *B. theobromae*, which lives on dead Hevea and can attack living stems through wounds, enters the dead shoot and grows downwards in the woody stem, gradually killing it down to the base. The death of such shoots may be followed by the death of the whole tree from the attacks of *B. theobromae*. In the cases examined by Mr. Petch the fungus had entered the tree after the shoots had been killed by "Die-back," not after they had been killed by wind or climatic conditions. It is also reassuring to learn, that no case has yet been recorded in which it has attacked the exposed cortex of the tapping cuts. *B theobromae*, Mr. Petch states, is an

EXTREMELY WIDE-SPREAD FUNGUS,

and it would be impossible to eradicate it, but there is no need to encourage it by neglecting to destroy dead stems and bushes killed by it,

COFFEE.

Sentenced to Death for Selling Coffee.

We often hear the statement made that it is impossible to increase the consumption of coffee in this country, but the odds against the enterprising grocer who determines to push the sales of the fragrant berry are small compared to those which had to be overcome by the first keepers of coffee houses in Turkey. When coffee was first introduced to that country it became so popular that the coffee houses detracted from the attendance at mosques, and became the meeting places of political agitators, so that Church and State united in condemning the beverage, and at one time the penalty for offering coffee for sale was death. In spite of these handicaps, the coffee merchants won, and to-day coffee houses are the most prominent features of a Turkish town.

A writer in *Scribner's Magazine* says :—

"For one who has ever walked the streets of a Turkish town it is almost impossible to imgaine them without coffee-houses. Yet, those resorts are of comparative recency among the Turks, and they were not acclimated without bitter opposition. While the properties of the coffee-berry are supposed to have been discovered or rediscovered by an Arab dervish in the thirteenth century, they were unknown in Constantinople until three hundred years later. The first coffee-house was opened there in 1554 by one Shemsi, a native of Aleppo. He returned to Syria three years later, taking with him five thousand ducats and little imagination of what uproar his successful enterprise was to cause. The beverage so quickly appreciated was as quickly looked upon by the Orthodox as insidious to the public morals—partly because it seemed to merit the recommendations of the Koran against intoxicants, partly, because it brought people together in places other than mosques. 'The black enemy of sleep and of love,' as a poet styled the Arabian berry, was variously denounced as one of the Four Elements of the World of Pleasure, one of the Four Pillars of the Tent of Lubricity, one of the Four Cushions of the Couch of Voluptuousness, and one of the Four Ministers of the Devil—the other three being tobacco, opium and wine. The name of the drug may have had something to do with the hostility it encountered. Kahveh, whence our coffee, is a slight modification of an Arabic word—literally meaning 'that which takes away the appetite'—which is one of the names of wine. The stimulating effect of coffee, however, is more than a name."

In Greece also the beverage is popular, the consumption *per capita* being more than twice that of this country, and the Central European countries are also becoming enamoured of coffee, and the consumption is rather larger proportionately than that of the United Kingdom. A useful lesson may be drawn from our friends the Turks who popularised coffee by means of their cafés. Our experience in this country is that in suitable districts a café is nearly always a success, and that when good well-made coffee is supplied, a large trade in coffee for home use almost invariably follows. Many grocers who have no room or time to run a café of their own might do much by arrangement with some existing café or restaurant. We know of cases in which the grocer supplies freshly roasted coffee daily, and exchanges the unused portion and in consideration of this generous treatment has his name and advertisements of his coffee on the menu.—*The Produce Markets' Review.*

The Planters' Chronicle.

RECOGNISED AS THE OFFICIAL ORGAN OF THE U. P. A. S. I., INCORPORATED.'

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THE U. P. A. S. I.

(INCORPORATED)

Contents.

The Editor has only been able to find room for one page of Mr. Baxendale's interesting paper on Rubber in continuation of the last publication, but hopes to conclude the paper in next week's issue.

The Scientific Department issues a valuable paper on various topics of interest to the planting community. The method of burning lime should attract the attention of those who are within reasonable distance of deposits, and the importance of manganese as a plant food is noticed.

The reports of the Wynaad Planters' Association and the Central Travancore Planters' Association are published. Particular notice should be taken of the fact that the Mysore Government do not recognise the contracts with maistries attested before village patels.

Our correspondence columns are full of interesting letters, asking for information, and receiving replies from the highest authority. Lately there has been an awakening of interest shown by many planters, seeking for light, and the Editor sincerely hopes that his columns will now onwards be more freely used, and that the interest roused will not be allowed to lapse. In reply to a previous correspondent we publish a clear and lucid letter on Estate Accounts, which should lead to others.

Mr. Anstead, Planting Expert, replies to Mr. Gerrard on Brushing and Spraying, and both he and Dr. Coleman reply to Mr. Danvers on the Fertilisation of Coffee.

To Mr. Graham "A Curer" replies and expresses willingness to set the former's doubts at rest as regards rebates on Freights.

We consider Messrs. Stanes & Co's offer to guarantee their manure bags free from infection both timely and wise, merits the approbation of the planting community. Mr. King-Church who first mooted the question, is to be congratulated on the rapid response to his suggestion.

Secretaries of District Associations are reminded, that the thirty days' notice required to place original motions on the Agenda Paper has elapsed.

THE SCIENTIFIC DEPARTMENT, U.P.A.S.I.

Method of burning Lime. - The problem of good lime for agricultural purposes is a very important one. Most planters are agreed that an occasional dressing of lime is necessary on our soils which are very deficient in this important constituent, and, especially in the case of Coffee, apt to become acid an account of the large amount of humus added annually to the soil by the leaves which fall from the shade trees and the use of poonac, fish, and cattle manure. The necessity for using Lime and its importance with regard to the bacterial activities in the soil has been described at length in the pages of the *Chronicle* from time to time. (See Vol. V, p. 324 and VI 300). The cost of the material is, however, very high and, owing to the scarcity of limestone deposits in the neighbourhood of estates, most of it has to be transported from the coast. This is generally an expensive business, and the quality of the lime thus obtained is often poor, and frequent complaints are heard that the material contains a high percentage of stones and unburned material. An investigation has shown that in some places, notably in the neighbourhood of Hunsur, at the foot of the Bababudin Hills, and in the Kanan Devan Hills, good local deposits of limestone exist, and it has been several times suggested that it would pay planters to develop these deposits and burn their own lime. A planter some time ago wrote an interesting paper in the *Chronicle* on the subject (Vol. V, p. 475), *In Circular No.* 130 *of the Bureau of Plant Industry of the U. S. Department of Agriculture* which has just come to hand, an article appears entitled, " A simple and economical method of burning lime," and the following is quoted from it. Though all the conditions naturally do not apply to this country, it contains some valuable hints, which might well be adopted by those who are interested in the subject. The paper in question gives the results of the experience of burning lime on a farm during the spring of this year.

" The kiln was located on top of a bed of limestone, the greater part of which was exposed, or very near the surface. Poles and slabs were placed lengthwise on the ground, making a layer 30 feet long and 16 feet wide. The largest poles, 8 or 10 inches in diameter, were used for the outside rows in order to make a more stable foundation. The smaller poles and slabs were placed between the large outside poles; and these made up the layer, except for a strip 2 feet wide in the middle, where small wood and kindling were placed the entire length of the kiln. Chinks between the poles and slabs were filled with fine wood and corn stalks. Fine coal was then placed as a second layer to a depth of 2 inches. On top of the coal was placed a 4 or 5 inch layer of limestone crushed to the size of a man's head or smaller. Another layer of coal was then added and this was followed by a layer of limestone 12 to 14 inches thick. Alternate layers of coal and stone were added until the pile was 7 or 8 feet high. The sides were gradually drawn in, making the pile somewhat pyramidal in shape and drawing it to a peak, and were then coaled up by shoveling on as much as the crevices would hold. The kiln was then ready to be fired. A fire was started on the windward and near the middle, where the strip of kindling had been placed. This gradually began to burn. In a day or two, as the fire began to burst out of the sides, dirt was shovelled over it to smother the fire and keep it from burning too rapidly. The burning of the kiln continued about two weeks. After it had cooled off, the dirt was removed. The kiln contained nearly 87 tons of lime and cost 80.10 dollars."

The effect of Manganese on Plants,—I have recently received an enquiry about the effect of Manganese as a fertiliser for Coffee. I have no information as regards Coffee especially, but a good deal of work has been done recently in America, and elsewhere, on the effect of Manganese in the soil upon plants generally. It appears to be proved that Manganese is distinctly harmful to Pineapples. In manganiferous soils the roots of this plant are less extensive and have characteristic swollen tips, marking the cessation of the lateral growth of the roots, death and decay immediately following. The chorophyll is at the same time bleached. A Bulletin on this subject has been published by Messrs. Wilcox and Kelley (*Hawaii Agricultural Station Bulletin 28*)

Manganese is constantly present in plants, thus explaining wholly or in part the origin of the element in the animal organism. The chlorophyll bearing parts of the plant appear to have more Manganese in them than the underground portions.

A Circular was published by the U. S. Department of Agriculture in January of this year by Messrs. Sullivan & Robinson. These investigators found that Manganese was very active in promoting oxidation changes brought about by oxidising enzymes in plants. In soils also, the power to oxidise easily oxidisable substances is related to the amount of Manganese present and the nature of the organic matter. The growth of the micro-organisms is modified, and their biochemical activities in the soil changed. The absorption of lime and magnesia by plants is increased by the addition of Manganese to the soil.

Manganese is naturally present in soils in amounts up to 0.5 %, calculated as MnO., especially in the surface soil. The usual forms present are silicates and the hydrated dioxide.

The most effective compound as a fertiliser is the sulphate, the least effective being the dioxide. In large amounts, the sulphate is more toxic than the carbonate. The amount of sulphate added should not exceed 100 lbs. per acre.

Yearbook of U. S. A. Department of Agriculture.—In the Yearbook of the United States Department of Agriculture for 1912, the Secretary in his report states that in Porto Rico the renovation of coffee plantations has been given much attention with promising results, and the value of pruning, fertilising, and cultivating the trees have been demonstrated. By following these means a renovated plantation was made to more than double the average yield of the island. New varieties of coffee have been introduced and many of the higher priced coffees of the world are now in bearing and their seed is being distributed for planting.

In the tables of statistics in the Year Book, the export of Coffee from British India for 1911 is given as 24,593,408 lbs. out of a total world production of 2,370,316,425 lbs., or 1%.

It is mentioned that the culture of American Tea has been introduced in a demonstration experiment now yielding an annual crop of 14,000 to 16.000 pounds of high grade tea, all of which finds a ready market in competition with imported teas.

The export of Tea from British India in 1911 is given as 265,022,376 lbs. out of a world production of 752,896,694, or 35'2%.

Camphor culture has been introduced into Florida with results sufficiently promising to attract private capital on an extenstve scale.

It is noticeable that the export of Oilcake and oilcake meal from British India in 1911 was 159,808,768 lbs. out of a world's production of 5,444,961 873 lbs., or nearly 3%.

R. D, A.

DISTRICT PLANTERS' ASSOCIATIONS.

Wynaad Planters' Association.

Proceedings of a General Meeting held at the Meppadi Club, on July 9th, 1913.

PRESENT.—Messrs. Bownass, Briggs, Macbain, Milton, G. R. C. Parker, Powell, Stewart, Vernede, West and C. E. Abbott (Honorary Secretary). *Visitor*:—Mr. Whitton. Mr. Powell in the chair.

1841. *Proceedings of last Meeting* were confirmed.

1842. *Shipment of Tea during Monsoon.*—Read further correspondence.—Recorded.

1843. *Membership of District Board, Malabar.*—Read letter from Mr. J. Carson Parker resigning his Membership as representative of the Association, he having left the District. This was accepted with much regret.

Proposed by Mr. Macbain, seconded by Mr. Powell: "That Dr. Frank Milton be nominated to succeed him."—Carried unanimously.

1844. U. *P. A. S. I. Meeting.*—Proposed from the chair: "That Mr. Bownass be elected Delegate, and Rs 200 voted for his expenses."—Carried unanimously. The agenda paper was discussed, and certain points noted to be dealt with by the Delegate.

1845. *Postal Delays.*—Read instances of very great delay in the delivery of parcels, which appears to occur between Calicut and Wynaad. A Member present also complained of packets of English papers bring torn open and some abstracted, and of the delay in delivering telegrams and Money Orders, the latter at Sultans Battery. Members were requested to send further instances to the Honorary Secretary for record. However, shortly after the Meeting the Meppadi Office was closed for 8 days for the delivery or receipt of all telegrams, Money Orders, registered letters, parcels and sale of stamps, owing to the serious illness of the Postmaster, there being nobody to act for him. The following instances of delay in delivery of parcels (which was also remarked on at the least Meeting, see para. 1832) were given by Members.

Parcel 4001 despatched from Calcutta on February 21st received at Meppadi on March 8th, 1913.

Parcel 402 despatched from Calicut on March 29th received at Meppadi on April 1st, 1913.

Parcel 111 despatched from Calicut on June 27th received at Meppadi on June 30th.

Three insured parcels despatched June 21st from Calicut, which had not been received on June 28th when the complaint was made.

Parcel despatched from Madras on July 7th reached Meppadi on July 13th. The Honorary Secretary was instructed to address the Postmaster-General on this subject.

1846. *Telegraph Offices.*—Read letter to the Superintendent of Telegraphs, West Coast Division, dated June 5th informing him with reference to a previous communication; "That the residents at Sultans Battery are willing to guarantee the Department against loss if an office is opened there, and enquiring what the amount of guarantee required will be." No reply having been received, the Honorary Secretary was instructed to write again.

1847. *Attesting Contracts in Mysore.*—Read letter to the Honorary Secretary from Mr. Tavera, Magistrate, Vayitri, calling attention to his letter of November 28th, 1912, as contracts attested by officials who have no authority to do so, are still brought before him.

"The only officials of the Mysore State who are authorised to witness labour contracts are—Amildars, Sub-Registrars, Taluq Sheristadars and Hobli Sheikdars. I have ascertained from the Taluq Magistrate of Nanjangode that Hobli Sheikdars are of the same status as the Revenue Inspectors in the British Territory and that the term does not include the Patal who is the village Munsiff, and the Shanbogue who is the village Accountant. The majority of the contracts between Maistries and labourers which are drawn up and executed in the Mysore State are attested by the Patal, and I have the honour to request that you will kindly instruct the Members of the Association to warn their Maistries against taking contracts in future to Patals (or Monigars as they are also called) for attestation."

Members are reminded that H. H. the Maharaja's Government has distinctly refused to authorise Patals and Shanbogues to attest contracts.

1848. *Execution of Warrants in Mysore.*—Proposed by Mr. Stewart seconded by Mr. West: "That the Bangalore Delegate be requested to bring up the most unsatisfactory state of the execution of warrants in Mysore.—Carried.

1849. *Registration of Maistries.*—Read with interest Mr. Nicolls circular on this subject. The Meeting hoped he would bring it forward for discussion at Bangalore.

1850. *Post Office at Vellera Mulla.*—It was suggested that this be removed from its present site which is a long distance from any residents, to one on Pootoo Mulla Estate, where the Manager is willing to provide a building.

(Signed) S. H. POWELL,
Chairman.

(„) C. E. ABBOTT,
Hony. Secretary.

Central Travancore Planters' Association.

Minutes of the second Quarterly General Meeting of this Association held at Glenmary Bungalow, on Saturday, 19th July, at 10 *a.m.*

PRESENT:—Messrs F. Bissett (Chairman), T. C. Forbes (Vice-Chairman), H. C. Westaway, J. S. Wilkie, R. D. Scoble Hodgins, J. H. Ellis, H. C. Bracher, Messrs. J. M. Wilkie and J. H. B. Sullivan (Visitors) and Mr. R. P. Roissier (Honorary Secretary).

The Notice calling the meeting was read.

The Proceedings of the last Meeting were taken as read and confirmed.

Correspondence.—Read letter from the Resident of Travancore and Cochin, No. R. O. C. 2096/13 of 26th May *re* Kuttikanom Arrack Tavern.

Resolved " That the Honorary Secretary do write to the Resident and thank him for advice."

Read letter from the Resident of Travancore and Cochin, No. R. O. C· 831/13. Resolved: " That the Honorary Secretary do write to the Resident and inform him that this Association is at present unable to nominate a witness."

Read letter from Mr. E. F. Barber dated 6th May *re* the European Defence Association. Read letter form the Honorary Secretary, Nilgiri Planters' Association dated June 28th *re* " Registration of Maistries."

Read letters and Telegrams from Mr. J. A. Richardson and the Honorary Secretary, Kanan Devan Planters' Association *re* the forthcoming deputation to the Governor of Madras on the subject of the Railway to Kuravanooth.

The Honorary Secretary was instructed to write and ask the Honorary Secretary Kanan Devan Planters' Association, for the place and date of the Meeting. Read letter from the Postmaster-General, Madras, dated 27th May. No. M. C. 47. Read letter from the Postmaster, Peermade, dated 13th May, No. 49. Read letter from Mr, J. A. Richardson, dated 3rd July, *re* Motor Transport. It was resolved " That the Honorary Secretary do write to the Chief Engineer *re* the bad condition of the first 5 miles of the Kottayam-Mundakayam Road and also of the Kumili-Peermade Road, Vandiperiyar Section, Copies of this letter to be sent to the Dewan and Resident." Read U P.A.S.I. Circulars Nos. 9/13, 10/13, 11/13, also Circular letter of 25th June.

Bangalore Delegate U. P. A. S. I.--Mr. Westaway proposed that Messrs. R. P. Roissier and J. S. Wilkie be asked to represent this Association as Delegates at the forthcoming U.P.A.S.I. Conference. Seconded by Mr. J. H. Ellis and carried unanimously.

Mr. Roissier thanked the Chairman and the Members of the Association for the honour they had done him in electing him as one of their Delegates. Mr. Wilkie also thanked the Chairman and the Members for having elected him.

The Chairman proposed that the Delegates be given Rs. 100 each for expenses.

Agreement Forms. Breach of Contract.—It was agreed to postpone the discussion on this subject till the next General Meeting.

Resolution by Mr. Westaway.—Mr. Westaway proposed " That the Honorary Secretary do write to the Excise Commissioner requesting him to accept Coast Agents' Certificates as a guarantee against the importation of dutiable goods." Seconded by Mr. J. S. Wilkie and carried unanimously.

It was resolved " that copies of this resolution be sent to Coast Firms and to other Associations concerned asking for their support."

A vote of thanks to the Chair was proposed by Mr. Ellis and seconded by Mr. Westaway and carried unanimously.

The Proceedings then terminated.

(Signed) REGINALD P. ROISSIER.
Hony. Secretary.

CORRESPONDENCE.

Estate Accounts

THE EDITOR,

Planters' Chronicle.

My attention has been drawn to X's letter in the *Chronicle* of May 17th, which I think is a very sensible one and were his requests followed out, it would add much to the interest of our weekly paper.

Our worthy Editor rightly points out, however, that these articles must be written by planters themselves.

As there seem to be a lot of enquiries regarding Estate accounts and the best forms of keeping the same, I have undertaken to write a short article on these, though the subject is a dry one and rather difficult to explain fully on paper.

I think I may say without boasting that, I can speak from some experience on this subject as I have the accounts of Five Companies and several private Estates through my hands every month.

The form I use was adopted after the combined discussion and approval of the Directors of the above mentioned Companies, and I think will be found fairly concise and simple.

I will send a few samples of these forms to the Secretary of the U. P. A. S. I., and they will be available at the August meeting for any one who wishes to see them.

The actual book-keeping I don't think calls for much explanation. There is only one way of keeping books, and that is by double entry. The books required for Estate purposes are Check-Roll, Cash Book, Journal and two or one large Ledger divided into two parts, so that the Kanganies advance accounts can be kept separate and the balance in this represents advances outstanding.

The only remarks I would make regarding the keeping of the books are, that the Superintendent should always write up his own journal, and either he or his Assistant should keep the cash book. A small petty cash account may be necessary for postages and other small items, which may be kept by the Office Writer.

There are various forms of Check Rolls, but I think there is no doubt that the best one is, that in which the monthly balances are carried forward after deducting cost of rice and stores, cash payments, &c., so that the balance shown in the final abstract represents the balance due to coolies and must agree with the balance shown in the Check-Roll account in the Ledger at the corresponding date.

This is one of the most important points in Estate accounts, and one on which there have been more losses than any other through carelessness in not checking this item monthly.

The advent of so many Companies in connection with the Planting Industry in Southern India, has upset the old forms of Estate accounts kept by private Proprietors and made a more complicated form of monthly report absolutely necessary.

To make this as concise as possible, and reduce the number of headings as much as practicable, has been my aim.

Working with Companies, it is imperative to keep Revenue and Capital Expenditure entirely separate, and with a view to this, I divide my report form into THREE headings.

Description of Works.	This month. Rs. a. p.	Previously. Rs. a. p.	Total to date. Rs. a. p.	Cost per lb.	Estimate Rs. a. p.	Estimated cost, per lb.
General Charges.						
1. Salaries and Allowances ...						
2. Fire Insurance ...						
3. General Contingencies ...						
4. Bank Commn., Post, &c. ...						
5. Recruiting Expenses and Bonus ...						
6. Medical charges ...						
7. Land Tax ...						
8. Visiting Agent ...						
9. Watchmen ...						
10. Survey & census ...						
UP-KEEP OF MACHINERY AND BUILDINGS.						
13. Lines ...						
14. Bungalows ...						
15. Factory buildings ...						
16. Stable and cattle sheds.						
17. Machinery ...						
18. Hospital ...						
19. Rice Store ...						
20. Furniture ...						
21. Wells ...						
Total ...						
Proportion to Revenue...						
Ditto Capital ...						

The total of these items is divided monthly between revenue and capital according to the acreage under each heading.

Description of Works.	This month. Rs. a. p.	Previously. Rs. a. p.	Total to date. Rs. a. p.	Cost per lb. Rs. a. p.	Estimate Rs. a. p.	Estimated cost. Rs. a. p.
Revenue Account.						
UP-KEEP OF MATURE TEA.						
24. Weeding ...						
25. Roads, Drains and Bridges ...						
26. Nurseries and Supplying ...						
27. Tools and Carts ...						
28. Pruning ...						
29. Forking & Manuring ...						
30. Ravines ...						
3. Pests & Diseases ...						
CROP EXPENSES.						
37. Plucking ...						
38. Manufacture ...						
39. Transport ...						
40. Packing & Packages ...						
41. Fuel and Water ...						
42. Shipping Charges ...						
Total Revenue account ...						
Plus Proportion of Gen. Charges, &c. ...						

Description of Works.	This month.	Previously.	Total to date.	Cost per lb.	Estimate	Estimated cost.
	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.
Capital Account.						
UP-KEEP IMMATURE CLEARINGS.						
46. Weeding ...						
47. Roads, Drains and Bridges ...						
48. Nurseries and Supplying ...						
49. Tools ...						
50. Pruning ...						
51. Forking & Manuring ...						
52. Pests & Diseases ...						
53. Shade Trees ...						
NEW CLEARINGS.						
58. Nurseries ...						
59. Felling and Clearing ...						
60. Lining and Holing ...						
61. Planting ...						
62. Supplying ...						
63. Weeding ...						
64. Roads and Drains ...						
65. Fences & Boundaries...						
66. Shade Trees ...						
67. Tools ...						
NEW BUILDINGS AND MACHINERY.						
71. Lines ...						
72. Bungalows ...						
73. Factory Buildings ...						
74. Machinery ...						
75. Stables & cattle sheds...						
76. Furniture ...						
Total Capital Account...						
Plus Proportion of General Charges...						
Grand Total (Revenue and Capital)...						

So that the total of Revenue & Capital represent the total Estate expenditure, and the Secretaries and the Directors can see at a glance the Revenue cost of their produce, and by adding on shipping and home charges, can calculate roughly their probable profit per pound.

The cost per pound should be worked out monthly against each item, so that it can be compared with the Estimate column and reasons given in the remarks column for any excess.

The Expenditure is divided up into headings, some of which of course are not used, but I see no way of reducing the number. Some report forms I have seen repeat the headings under General Charges twice over under Revenue and Capital, but this, I consider, quite unnecessary, besides entailing 10 or 12 separate calculations whereas the above report only requires the total to be divided.

On the reverse side of the form, we have Rice Account, Advance Account, Superintendent's Account, Current and Balance Sheet. Then a work statement, crop account, labour statement, acreage statement and remarks column.

I know many Planters will consider my report form too cumbersome, but we are now in the days of Companies who must have full details, and I am sure my form is not so complicated as many I have seen, and once the Journal is written up and balance sheet checked, the report form can be made out by the Office Writer, and the Superintendent has only to go through it to see that the different items are charged up to their proper headings.

A glance shows how Expenditure in every item compares with the estimated cost, and the Visiting Agent or Directors can see at once where any excess in expenditure is taking place.

Space will not permit of the form being printed here, but a few copies will be sent to Bangalore, where any one interested can see them at the U. P. A. Office.

I am afraid this is not a very interesting article, but I have written it by request and tried to make the best of it.

SOUTH INDIA.

Bangalore, July 29th, 1913.

Brushing Vs. Spraying.

Adderley Estate,
Coonoor P. O.,
Nilgiris,
23rd July, 1913.

The EDITOR,
The Planters' Chronicle,

Dear Sir,—In reply to the Scientific Officer's request for particulars of coolies employed on brushing, I have taken the averages over 4 months of this year. They are as follows:—

Average 23 coolies per diem, average 9·31 trees per cooly. I have not taken into account days when no brushing was done on account of rain.

Certain fields of this estate have to be brushed annually, owing to red ants which swarm in from the adjacent Government Forest. If it were possible to get free of these ants, bug work here would be very considerably reduced.

In the Scientific Officer's letter he mentions an estate in Coorg where spraying cost Rs.2/8 to 3 per acre for two sprayings. Does this include cost of material and preparing same? Also what size are the trees? I find that a cooly can only spray 50 trees thoroughly; bug being worst under the leaves, branches which overlap have to be lifted one by one to get at them thoroughly. On steep land, as I have, a cooly standing on the lower side can only reach the upper branches with difficulty. The figures I give in all cases include cost of preparing mixture, and some fields are nearly half a mile distant from the nearest water supply.

Re. Soda Ash.—I hope to obtain a supply of this shortly, when I shall make some experiments using this in place of Saltpetre. I do not use washing Soda now.

Yours faithfully,
(Signed) L. A. GERRARD ROGERS.

No. 645/1913.

Office of the Planting Expert,
Bangalore,
29th July, 1913.

THE EDITOR,
The Planters' Chronicle.

Dear Sir,—I understood from my correspondent that the figure quoted as the cost of spraying per acre included the cost of materials but from Mr. Browne's figures it hardly appears that this could have been so. The land is level and the trees large.

Thanks to the kindness of your correspondents, we now have a lot of information to go upon and each man must decide for himself which is the better method. I still think that spraying is the better at the beginning of an attack at any rate when it is important to get over a big area quickly to prevent the pest spreading, and this was the position in Mysore and Coorg it must be remembered.

In Mysore it will resolve itself into a labour problem to a great extent I think. If a cooly only brushes 10 trees a day a large number are needed to treat a big acreage, and whenever I recommend a method like applying manures twice a year, or making and putting out compost, I am usually met with the objection, that it takes too much labour. It is comforting to know that those who adopt brushing evidently do not suffer from this defect.

Personally I shall welcome more letters on this subject from others who have tried the methods under discussion. It is only by comparing notes in this way, that we can form useful opinions, and I feel sure that my friends in Mysore and Coorg, who fortunately have had little experience in dealing with this pest, must find this correspondence as interesting as I do.

Yours faithfully,
(Signed) RUDOLPH. D. ANSTEAD,
Planting Expert.

Fertilization of Coffee.

The EDITOR,
The Planters' Chronicle.

Sir,—Dr. Coleman's article on the above subject is extremely interesting, and his promise of further information gratifying. It would appear that the benefits of cross fertilization are recognized in other branches of fruit cultivation, for a friend of mine when at home, was informed by a grower of apples that in those of his orchards where a few crab apples existed, he found his crop set better than in those without any. Acting on this, my friend caused Liberian plants to be put in here and there at fair intervals all over his coffee fields—and I followed suit last season with Robusta, for the same purpose. From what Dr. Von Faber says of the self reliant tendencies of Liberian, Robusta would appear to be the more advisable variety.

The whole subject of Fertilization is very interesting, and very puzzling to the ordinary planter; bees and insects appear to be valuable aids to it, judging from the results in certain seasons when these abound; and yet I have known healthy looking blossom entirely fail to set when all seemed favourably—and the contrary. Last April both bees and insects were curiously absent from the blossom on most of the Estates in my charge, yet with the exception of the buds injured by sun, it seems to have set quite well. Occasionally, non-fertilization occurs on quite a large scale; and though the berries swell and are brilliantly green, they are found to be hollow. I have always connected this with unfavourable blossom showers, but Dr. von Faber may know another reason!

Yours faithfully,
(Signed) C. DANVERS.

P. S.—Can and will Dr. Coleman give us the arguments by which Dr. von Faber arrived at the conclusion, that cross fertilization was the original method with Liberian, and that self-fertilization arose later? I have no doubt that they are conclusive! but to my present ignorance it seems a retrograde step, considering the benefits of cross fertilization and the tendency generally towards " the better way."

No. 644/1913.

Office of the Planting Expert.
Bangalore,
28th July 1913.

THE EDITOR,
The Planters' Chronicle.

Dear Sir,—Mr. Danvers may be interested to know that Messrs. C. J. Lewis and C. C. Vincent in an Oregon Agricultural Station Bulletin in 1909 gave an account of some works done with Apple pollination on account of many complaints from various part of the State relative to the lack of setting of fruit. They found that neither plum nor apple pollen was transmitted through the air by wind in sufficient quantities to ensure cross pollination, and of 87 varieties of apples 59 were found to be self sterile, 15 self fertile, and 13 partially self fertile. The consequence is that insects are necessary to polliuate the flowers and produce fruit. In 1910, Mr. W. Backhouse found that European plums fall into two sharply defined groups self fertile and self sterile, and of course the latter must be cross fertilised to produce fruit and in some recent work the same investigator has shown that insects are necessary for efficient pollination of apples and plums whether a tree is self fertile or not.

'In the case of Coffee the most important point to my mind is the difference in *quality* that there may be between berries cross fertilised by insects and self fertilised. It would be interestieg to know if Mr. Danvers can show any decided difference in the quality of his crop this year when insects were notedly absent from the blossom and so the berries possibly self fertilised, and a crop in which insects were notedly abundant during the blossom period.

I say *possibly* self fertilised above because wind may play a part in the pollination of coffee. The whole subject is interesting and difficult but it is hoped that the pollination experiments being carried out in co-operation with the Government Entomologist on a number of estates in Mysore and Coorg this year may throw some light upon it.

With regard to Mr. Danver's post-scrip, Dr von Faber concluded that self fertilisation arose later than cross fertilisation to guard against failure of fertilisation in a year like this, when insects being absent, if only cross fertilisation existed, there would be no fruit produced. This is hardly a retrograde step but rather an advance, since the coffee has now developed two methods of fertilisation, and this insures the production of a crop. If one fails the other succeeds, and for choice, the plant prefers cross fertilisation, and hence the wonderful provision that the pollen tubes from outside pollen, grow faster than those of its own pollen and thus reach the ovaries first.

Yours faithfully,
(Signed) RUDOLPH D. ANSTEAD,
Planting Expert.

Department of Agriculture, Mysore,
Bangalore, July 30th, 1913.

Fletcher Norton, Esq.,
Managing Editor.
"Planters' Chronicle,"
Bangalore.

Dear Sir,—With reference to your letter of the 29th instant I think Mr. Anstead has explained Mr. Danvers' difficulty clearly. Dr. von Faber's reason for considering cross fertilisation to be the normal and original method of fertilisation in coffee is simply the fact that the coffee flowers possess all the usual characters that go along with insect fertilisation, *viz.*, striking colour, scent, &c.

There are a good many examples of plants which from their appearance and structure of their flowers must have originally been fertilised by insects and which now depend entirely or almost entirely on self fertilisation for the production of seed.

I am writing to Dr. von Faber for further information with regard to his investigations on fertilisation of coffee.

Yours faithfully,
(Signed) LESLIE C. COLEMAN, M.A., Ph. D.,
Director of Agriculture.

Freights.

28th July, 1913.

THE EDITOR,
The Planters' Chronicle,
Bangalore.

Dear Sir,—Mr. John A. Graham's laudable endeavour to arouse his sleeping brethren? to the gross injustice which has been for many years perpetrated upon the Planting Community by that "vile blood sucking reptile" the Coast Agent, can only be classed as a spasm, due to a want of knowledge on the subject on which he wishes to invite united action apparently!

Mr. Graham may be interested to hear that the much discussed question of Freight rebates was more or less laid to rest in 1894 I think, chiefly because one if not more of the agitators realised the equity of the Curer's position in regard to these freight returns.

I should be glad to give any information Mr. Graham may wish for and which may ease the tension? between curers and planters on this subject.

I am, dear Sir,
Yours faithfully,
A. CURER.

Green Bug.

Coimbatore, 29h July, 1913.

The Managing EDITOR,
The Planters' Chronicle,
Bangalore.

Dear Sir,—With reference to the suggestion by Mr. L. King-Church in your issue of the 14th instant and the Government Entomologist's recommendation, we beg to state that for our part we are issuing the following guarantee which we think fully meets the case:—

"We guarantee that all our manure bags are absolutely free from infection when despatched from our Works, and we are further prepared to wash each bag with an insecticide solution prior to despatch or if preferred, to supply free of cost sufficient insecticide to spray the bags on arrival at Estate."

We dare say other Firms will be prepared to do the same.

We are, dear Sir,
Yours faithfully,
For T. STANES & Co., Limited,
(Signed) F. J. STANES,
Director.

RUBBER.

The Plantation Rubber Industry.

by

CYRIL E. S. BAXENDALE.

A Paper Read at the Third International Rubber Conferenec, held in New York, 1912.

(Continued.)

CULTIVATION.

With your permission I will now direct your attention to a few details connected with our plantation work.

At first, the cultivation was almost entirely confined to interplanting *Hevea* trees through the old fields of coffee, but a few bold spirits ventured to clear the jungle for this product only. But it is regrettable to mention that some tempered their rashness by planting rubber and cocoanuts in alternate lines, and had to pay rather heavily for their caution, by being forced to cut either one or the other when both required more room for expansion. I need hardly mention that it was usually the cocoanuts that were condemned. As one who does not believe in keeping two good things in a parcel not large enough to hold both, I have planted the two products in adjoining fields; and, perhaps, for that reason, my feelings have always been harrowed by the woeful spectacle afforded by the destruction of thousands of these valuable palms.

The interplanting of *Ficus Elastica*—the red rubber of commerce (this has no connection with the rubber shipped from the Congo)—was at one time popular, particularly on the estates of the coast districts, but although this variety yielded a fair quantity at the first tapping, it did not compare at all favorably with *Hevea* in continuous yield, and the tapping seemed to check its growth. A considerable area remains under this variety in Sumatra, but it has become a negligible quantity in the Peninsula and has never been in favour in Ceylon.

At the outset we obtained our *Hevea* seeds from the original stock, and this was an expensive item, which has gradually declined in cost, now that we have trees of all ages and have no certain knowledge of any difference in the quality of the plants, whether raised from seeds of old or young trees.

In the hilly districts ordinary surface drainage is required, but near the coast great care has to be taken to select land which can be drained efficiently, and this work frequently, involves considerable expense. Fortunately for us, Malaya is not subject to tidal waves, as large areas of our first plantations are only a few feet above sea level. The drains are laid out with the compass, and cut through the living jungle before felling. The jungle is then cut down and the branches lopped to a level of about 4 feet from the ground. A few weeks later, the burning is carried out by a line of men walking at ten to twenty yards apart, with their backs to the wind; and in favourable weather, the undergrowth and smaller branches are consumed. Afterwards the unburnt branches and small trees are piled and burnt, and generally speaking, when this is done the field is described as cleared, although the stumps and trunks of the big jungle tees still remain on the land. Recently on some estates, heavy expense has been incurred in getting rid of these, before planting, as a precaution against the spread of root disease and white ants.

(To be continued.)

The Planters' Chronicle.

RECOGNISED AS THE OFFICIAL ORGAN OF THE U. P. A. S. I., INCORPORATED.

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THE U. P. A. S. I.

(INCORPORATED)

Contents.

The Scientific Officer publishes a highly interesting article on the effects of Nitrate of Soda and Saltpetre on the flow of Ceará Latex. The tables accompanying the article are worthy of close study. The continuance and results of the experiments by the Kalisyndicate will be awaited with much interest.

The Proceedings of the Bababudin Planters' Association and the Nilgiri Planters' Association are printed. The latter contains much that will come up for discussion at the Annual Meeting.

Correspondence of interest to all takes up a good deal of space. A letter from the Chairman to the Secretary, originally circulated to the Councillors of the Association, is reproduced, in the expectation that it will rouse general interest and sympathy with the Labour Committee, who had a hopeless task to harmonise conflicting opinions, but from the Chairman's letter it will be noticed that it is yet hoped to place before the delegates some suggestions that may tend towards the solution of this thorny question. The letter is published for the information of individual readers, to show them that the subject has been one of constant thought and intercommunication between the members of the Labour Committee. A letter from Mr. Brown on Green Bug finds a place, and deals chiefly with the question of the use of sprayers, and he still maintains his opinion that Brushing is the better method.

Messrs. Stanes & Co. send, in answer to "Stymied," a letter showing the fluctuation in prices that artificial manures are subject to.

From Mr. Barnard, Superintendent of Munderi Estate, comes a thoughtful letter, with which many no doubt will disagree. His opinions are worthy of all consideration and attention.

"Hermit Crab" replies to "South India's" letter, and we trust that having entered the arena, he will not withdraw into his shell.

"Sleeping Brother's" letter should "flutter the dovecots" of the Curers.

Translation of "A Crimping Letter" is published, and the Editor hopes that the would-be Crimper will be traced and pilloried.

Scientific Officer's Papers.

CXXI.—THE EFFECT OF NITRATE OF SODA AND SALTPETRE ON THE FLOW OF CEARA LATEX.

In 1911 an experiment was begun in Coorg to test the effect of an application of Nitrate of Soda upon the flow of latex in the Ceara rubber tree. This experiment was suggested by some favourable results obtained in Hawaii and published in one of the Agricultural Experiment Station Bulletins of that place.

Preliminary experiments with a few selected trees showed that an increased yield of rubber was obtained by applying Nitrate of Soda, and the Hawaiian results were confirmed to a certain extent. (See *P. C.*, Vol. VI, p. 203). The results obtained in Coorg seemed to warrant a further trial on a larger scale, and during 1912 trials were made with both Nitrate of Soda and Nitrate of Potash on plots of 50 trees each.

The system of tapping was the same throughout, full herring bone with a V channel, the cuts 12 inches apart, tapped every day with the exception of Sundays. There was a very light rain fall during the period of experiment and the plots were watered to wash the manures in. In the tables of yield below the figures show the weight of latex in ounces. The manures were applied to all the plots on 4th December, 1912 and the first five tappings shown in the tables were made before the manures were applied in order to find the relative yield of the plots. The experiment falls into two classes; one a test with Nitrate of Soda and Saltpetre on an area of Rubber *known to yield badly*; the results on this area are given in Table I. plots 1 to 5. The second experiment was a test of Nitrate of Soda on an area of Rubber *known to yield well*; the results of this experiment are given in Table II, plots 6—8.

In order to correlate these results and eliminate as far as possible the initial differences between the yield of the different plots which existed before the manures were applied, the percentage increase or decrease above or below the control plot has been calculated for each group of five tappings. These figures will be found in Table III below.

It will be seen from these tables that in the first experiment with rubber known to yield badly (plots 1 to 5) both the application of half a pound of Nitrate of Soda per tree and one pound of Saltpetre per tree resulted in an increased flow of latex and yield of rubber, and that this increase is above the 10% which according to Hall represents the experimental error in field experiments. This result is very satisfactory in that it again confirms the Hawaiian results and repeats those obtained last year in Coorg, as far as Nitrate of Soda is concerned.

In the second experiment with rubber known to yield well the addition of half a pound of Nitrate of Soda per tree made practically no difference to the yield of latex, showing that in this area the conditions could not be bettered in this way, and that as good a yield as possible is already being obtained.

The results obtained with Saltpetre are of great interest because this fertiliser contains two plant foods, potash and Nitrate, while Nitrate of Soda contains only one. It gave a slightly better result, though whether this was due to the potash, or to the fact that weight for weight it coutains less nitrate than the soda, there is insufficient data to decide.

TABLE I.

Date of Tapping.	Plot 1.	Plot 2.	Plot 3.	Plot 4.	Plot 5.	Climatic Conditions.
November 29 ...	37	39	32	28	40	Comparative tests Light rain.
,, 30 ...	34	37	31	25	37	
December 2 ...	34½	40	32	28	38	
,, 3 ...	31½	38	30½	25	36	
,, 4 ...	29½	37½	30½	23½	35	
Totals ...	166½	191½	156	129½	186	
	Nitrate of Soda.		No Manure.	Saltpetre.		Manures applied 4 December.
	1 lb. per tree.	½ lb. per tree.	Control.	½ lb. per tree.	1 lb. per tree.	
December 5 ...	28	40½	31	22	37	East wind
,, 6 ...	27	42	31	20½	37½	,, ,,
,, 7 ...	24½	37½	27	19½	36½	,, fine
,, 9 ...	20	31½	23	18	34	,, ,,
,, 10 ...	16½	27	18½	16	33	,, cold
,, 11 ...	12	21	13	13½	20	,, ,,
,, 12 ...	19½	27½	17½	15	19½	,, ,,
,, 13 ...	18	27	18	13½	22½	,,
,, 14 ...	17	22½	17	13½	20½	,, Cloudy warm
,, 16 ...	15	23	16	13	19	Fine cold
,, 17 ...	15	20½	17½	12	24½	,, ,,
,, 18 ...	14	18	12½	8	20½	,, ,,
,, 19 ...	11	19	13	11	18	Cloudy
,, 20 ...	17	21	14	13½	19½	,, warm 70° F
,, 21 ...	18	20½	15	13½	18½	Cooler Misty
,, 23 ...	17½	20	15	13	19½	Fine cold
,, 24 ...	17½	19	14	12	21½	,, ,,
,, 25 ...	20	19½	15	12	18½	,, ,,
,, 26 ...	17½	18	14½	10	21	,, ,,
,, 27 ...	14	15	12	8½	17	,, ,,
,, 28 ...	16	16½	14½	12½	18½	,, ,,
Totals. ...	375	506½	369	290½	496½	

TABLE II.

Date of Tapping.	Plot 6.	Plot 7.	
November 29 ...	81	68	
„ 30 ...	91	73	
December 2 ...	90½	73	Comparative tests.
„ 3 ...	91½	78½	
„ 4 ...	92½	82	
Totals ...	446½	374½	
	Nitrate of Soda. ½ lb. per tree.	No manure Control.	Manure applied 4 December.
December 5 ...	94	77	
„ 6 ...	85½	77	
„ 7 ...	83	65	
„ 9 ...	67	55	
„ 10 ...	56½	49½	
„ 11 ...	38	31	
„ 12 ...	34	41½	
„ 13 ...	35	42	
„ 14 ...	39	45	
„ 16 ...	37½	43½	
„ 17 ...	40½	42½	
„ 18 ...	33½	37½	
„ 19 ...	34	41	
„ 20 ...	35	46½	
„ 21 ...	36	44½	
„ 23 ...	31	41	
„ 24 ...	33	41	
„ 25 ...	34	39	
„ 26 ...	32½	40	
„ 27 ...	32½	36	
„ 28 ...	34	38	
Totals ...	945½	963½	

TABLE III.

Percentage increase or decrease above or below the Control.

Tapping Dates.	Plot 1	Plot 2	Plot 3	Plot 4	Plot 5	Plot 6	Plot 7
29th Nov.—4th Dec. Comparative results ...	+ 6·7	+22·75	—	—17	+ 19·2	+ 19·2	—
	Nitrate of Soda		Control	Saltpetre		Nitrate of Soda	Control
	1 lb. per tree.	½ lb per tree.	—	½ lb. per tree.	1 lb. per tree.	½ lb. per tree.	—
5th Dec.—10th Dec.	-11·1	+29·9	—	—26·4	+28·7	+19·3	—
11th Dec.—16th Dec	0	+48·5	—	—15·9	+24·5	— 9·6	—
17th Dec—26th Dec	+13·1	+31·8	—	—19·7	+38·2	—15·9	—
5th Dec - 27th Dec.	+1·6	+37·3	—	—21·3	+34·6	— 1·9	—
Nett Gain ...		+14 5			+15·4		

These experiments are as yet only in their preliminary stages. The position is now that in 1911 small scale experiments showed that Nitrate of Soda did increase the flow of latex from Ceará as had been stated to be the case in Hawaii. This result has now been confirmed by experiments on a larger scale in 1912, and in addition it has been found that Saltpetre apparently still further increases the latex yield on areas which do not normally yield well, while on areas which normally yield well Nitrate of Soda apparently does not improve the conditions.

It is intended this year to continue these experiments on a still larger scale with Nitrate of Soda and Saltpetre, and also to test the effect of other fertilisers such as Calcium Nitrate and Nitrolim, and Sulphate of Potash and Muriate of Potash. The work will be merged into the Kalisyndicate Experiments to which it is hoped this preliminary work will prove a valuable aid.

RUDOLPH. D. ANSTEAD,
Planting Expert.

DISTRICT PLANTERS' ASSOCIATIONS.

Bababudin Planters' Association.

A Quarterly General Meeting was held at the Kadur Club, Chikmaglur, on Monday, July 21st, 1913.

PRESENT.—Messrs. R. D. Lovett (Vice-President), H. Allardice, F. Hugonin, H. W. Raikes, R. W. Thomson, H. Watson, and N. Kirwan, (Honorary Secretary). Mr. K. Krishnaiyer, Honorary Member.

The Minutes of the last meeting were read.

Papers with reference to the European Defence Association were read.

Green Bug.—No Bug has to date been found in the District. After some discussion as to whether the Association should purchase a stock of Sprayers, etc.. it was resolved: "That the Secretary should write to the Scientific Department and ascertain, which are the most effective type of Sprayer, price, and where obtainable, and circulate the reply to members."

Delegates to the U. P. A. Meeting.—Messrs. R. D. Lovett and S. H. Dennis, were elected as Delegates to the U. P. A. Meeting.

Labour.—After some discussion on Labour matters, it was decided to leave the question with the Association representative of the C. of P. A's, to be settled in conjunction with the other Associations.—Carried 5 to 2.

(Signed) NOEL G. B. KIRWAN,
Hony. Secretary.

Nilgiri Planters' Association.

At a General Meeting of the Nilgiri Planters' Association, held at the Armoury, Ootacamund, on 16th July 1913.

PRESENT.—The Hon'ble Mr. E. F. Barber (Chairman), Mr. L. L Porter (Vice-Chairman), Mr. J. S. Nicolls (Honorary Secretary), Mr. W. Rhodes James, Mr W. A. Cherry, Mr. A. K. W. Downing, Mr. G. W. Church, Mr. P. L. D. Beaver, Mr. T. Brown, Mr. R. N. C. Grove, Mr. C. W. Deane, Mr. A. A Brown, Mr. J. H. Pascoe, Mr. A. S. Dandison, Mr. C. Gray and Mr. L. A. G. Rogers.

Visitors.—Messrs. Gould, Gerard, Carson-Parker, Hindley, and Walker.

The Chairman before opening the proceedings referred to the death of Mr. W. H. Church. The Honorary Secretary was instructed to write to his relations in England sympathising with them in their loss.

No. 74. PROCEEDINGS OF LAST MEETING.—Confirmed.

No. 75. U. P. A. S. I. CIRCULARS.—Read and recorded.

No. 76. ROADS AND COMMUNICATIONS.—In reference to No. 65 of the Meeting held on the 28th March 1913, read Honorary Secretary's letter to the President, District Board. Nilgiris, and the President's letter of acknowledgment. It was decided to postpone further discussion.

The following resolution was proposed by Mr. T. Brown and seconded by Mr. Deane and carried.

> "That the Honorary Secretary be requested to ascertain what the rules as to compounding of tolls are."

The bad conditions of the road from Nadgani to the top of the Malabar ghaut and portion of the Vayitri-Gudalur road from the Nilgiri boundary was brought to the notice of the Meeting. The Honorary Secretary was instructed to write to the President, District Board.

No. 77. Publication of G. Os. in the Nilgiri Gazette.—In reference to No. 64 of the Meeting held on the 28th March 1913, the correspondence was read and recorded.

No. 78. Railway Freight on Tea Seed.—In reference to No. 67 of the Meeting held on the 28th March 1913, the correspondence was read and recorded.

No. 79. Scientific Department.—In reference to No. 68 of the Meeting held on the 28th March 1913, the correspondence was read and recorded.—The following resolution was proposed by Mr. Porter and seconded by Mr. Pascoe and carried unanimously:—

> "That this Association strongly holds that the continuance of the
> "Scientific Officer still be continued and that Mr. Anstead should
> "continue to act as Scientific Officer. Were another Scientific
> "Officer appointed, it would mean that it would take such officer
> "at least 2 years to get in touch with the needs of the various
> "districts. It is understood that the gross value of the exports
> "of planting products from the Madras Presidency amounts to
> "242 lakhs, and in consideration of these figures, the Govern-
> "ment contribution of Rs 5,500 cannot be considered ade-
> "quate."

No. 80. Customs Duty on Coffee, Tea and Rubber Machinery.—In reference to No. 72 of the Meeting held on the 28th March 1913, the correspondence was read and recorded. The Honorary Secretary was instructed to wire to the Secretary of the U. P. A. S. I. requesting that this matter should be put on the agenda of the Meeting of the U. P. A. S. I. to be held at Bangalore on 25th August, 1913.

No. 81. Act I of 1903.—Read Mr. J. Aird's letter and Honorary Secretary's reply. The Honorary Secretary was instructed to write to the District Magistrate pointing out the omission.

No. 82. Registration of Maistries.—Mr. Nicolls' scheme was discussed. Read letters from several members on the scheme. The Honorary Secretary was instructed to wire to the Secretary of the U.P.A.S.I. requesting that the matter be put on the agenda of the U. P. A. S. I. Meeting to be held at Bangalore on 25th August, 1913.

No. 83. Advanced Labour absconding into Travancore and Cochin.—Correspondence was read and recorded.

No. 84. Crimping of Labour.—Correspondence was read with satisfaction, the Ceylon Labour Commissioner being thanked for the way he had dealt with the matter.

No. 85. Capital (Nilgiri correspondent's) letter.—Correspondence was read and recorded.

No. 86, INCOME TAX.—Mr. J. J. McKenzie's LETTER – Correspondence was read and recorded.

No. 87. EUROPEAN DEFENCE ASSOCIATION.—Read correspondence. The Chairman hoped that all members of the Association would join.

No. 88. THE FOURTH INTERNATIONAL RUBBER AND ALLIED TRADES EXHIBITION AND THE FIRST COTTON FIBRE AND TROPICAL PRODUCTS EXHIBITION. Read the Collector of the Nilgiri's letter enclosing copy of G. O. No. 641.

No. 89. U. P. A. S. I. EXHIBITION.—The Chairman hoped the members of the Association would support it.

No. 90. U. P. A. S. I. AGENDA.—List of subjects were considered, special instructions being given to delegates on the matter of " Adulteration of Coffee."—Proposed by Mr. Porter and seconded by Mr. Pascoe and carried:—

" That this Association instructs its delegates of the U. P. A. S. I. " meeting to support any reasonable proposition brought up " which may tend

(*a*) to check the present system of Professional recruiters,

(*b*) any scheme for the establisment of a Labour Commission,

" working under the U. P. A. S. I. in the interests of the plant- " ing districts of South India."

All other subjects were left to the discretion of the delegates.

ELECTION OF DELEGATES.—Mr. Nicolls and Mr. Brock were asked to represent the Association, and in case Mr. Brock was unable to attend, Mr. Dandison was asked to attend.

Votes of thanks to the Chair and the O. C. Nilgiri Volunteers for the use of the room terminated the proceedings.

(Signed) E. F. BARBER,
(*Chairman.*)

(Signed) J. S. NICOLLS,
(*Hony. Secretary.*)

PAPERS ON TABLE. Memoirs of the Dept. of Agriculture in India Vol. II. No. 6.

Do.	do.	do.	Vol. III, No. 1
Do.	do.	do.	Vol, IV, No. 5.
Do.	do.	do.	Vol. V, No. 4 & 5.
Do.	do.	do.	Vol. VI, No. 1.

Report on the progress of Agriculture in India for 1911-12.

Department of Agriculture, Madras. Leaflet Nos. 1 and 2.

The Agriculture Journal of India April 1913.

Proceedings of Annual Meeting of the Indian Tea Association.

Report of the General Committee, do

U. P. A. S. I. Bulletin No. 2 *re* labour question.

Planting Gazettes for April, May and July (Ceylon P. A.)

CORRESPONDENCE.

Circular Letter.

THE LABOUR QUESTION.

Labour Committee.

Under date Meppadi, 28th June, the Chairman writes to the Secretary as follows:—

" I have consulted the Members of the Committee appointed at the last Annual Meeting, and they agree with me in thinking that we ought to issue a report on the opinions received from the various Associations about the Registration Scheme, and the possibility of harmonising them and circulating a working proposal with the idea of improving the labour position.

" We have come to the conclusion that it is impossible to harmonise the opinions.

" The Anamalai Association is the only one that has expressed itself whole-heartedly in favour of the Scheme. The Nilgiris will only support it if the Registration Bureau is made a Department of the U. P. A. S. I. and worked under its guidance. The Wynaad somewhat unwillingly agreed to adopt the Scheme provided Government would have all coolies' finger prints examined before allowing them to emigrate. The Kanan Devans and Malabar Coast flatly refuse to have anything to do with registering coolies. The other Associations are not actively hostile: but seem indifferent.

" Mr. Marden whose name was put forward as willing to run the Bureau asked for an advance of Rs. 20,000 to start it, a sum quite out of the power of the U. P. A. S. I. to furnish. Though if the Scheme were to be put through it was not an unreasonable amount to ask, and it could doubtless be easily raised for any purpose that the whole Community approve of.

" Looking at all the circumstances of the case, it seems very doubtful if the Madras Government would support the Scheme by having all intending emigrants detained at the Port of embarkation till it had ascertained that they had not been advanced to work in India. It certainly would not do so unless we could put forward a very strong case backed up by the unanimous vote of the Planting Community. It must be remembered that a very carefully worked out Scheme for universal registration which was brought forward at the 1909 Meeting by Mr. Brook was rejected by the District Associations after full consideration.

" It may perhaps be thought that that the Committee's task is finished now that it has said that it is unable to formulate a Registration Scheme that would be generally acceptable to Southern India Planters. But a great deal of information has been collected especially as regards the methods of recruiting for Ceylon and the Straits. The bulletins you have issued are very interesting.

" The year has not been wasted, though a Committee whose Members have to exchange their views by correspondence works at a great disadvantage. We hope to meet before the Annual Meeting, and to have some suggestions to put forward to improve matters; and the further views of District Associations would be very useful to us.

" Government may have to undertake an enquiry if this drain of emigration can be allowed to go on indefinitely. The Railways, the Public Works and the Forest Department are all suffering from the shortage of labour. Ceylon planters admit that they are unable to continue the reckless advances that the competition of labour involves. After all the bulk of Ceylon planters are growing tea, and cannot afford to go on raising the cost of production. Even when the cost of recruiting is not charged to revenue, Proprietors have grown tired of piling up the advance account.

"Our most dangerous rivals are in Malaya. But there as elsewhere, there must be a limit to expenditure.

"The suggestion has been made that there is no reason why we should not have a Labour Commission of our own like Ceylon.

"Another is that our coolies ought to have the same concessions on railways as those intended for Ceylon and the Straits.

"The Registration of Maistries (Kanganies) is a measure which more than one Association would like to adopt.

"I am sending copies of this letter to the other Members of Committee, and asking them to write to you saying if they agree with it, and to make any additions or minutes of dissent that they wish. The letters might then be issued as a circular to Councillors, and perhaps published in the "Chronicle."

The following are the replies to the above from Messrs. E. A. Hughes and C. H. Brock respectively:—'

"I received a copy of letter written to you by Abbott with reference to the above. I have written telling Abbott that I think I could arrange to meet the other Members of the Committee, a few days before the Annual General Meeting. This would be the best plan if it can be arranged. I am also in agreement with most of the points raised by Mr. Abbott in his letter, and I think if we have a meeting, we should be able to come to some sort of arrangement as a beginning at all events."

"With reference to the Chairman's letter to you dated 26/6/13, I have to inform you, that I am quite in accord with all the remarks that he has made."

Coonoor, 29h July, 1913.

Green Bug in Coffee.

THE EDITOR,
The Planters' Chronicle,
Bangalore.

Dear Sir,—That which Mr. Nicholson states about using a Sprayer long before Mr. Brown is quite correct in connection with his Brushing, only he was using the wrong sort, and had relegated them to the lumber room. He offered to sell them to me, and on sample I pointed out, that they were not the RIGHT SORT.

I used Sprayers when Green Bug first appeared in Coonoor about 1888, and chucked them aside as too much trouble. This Estate was covered with Brown Bug in 1881!!!

Recently I had to make a Plunger for a New Sprayer which was minus one, and which nobody else who handled the Machine detected!!!

On a very large Coffee estate (afterwards sold for a mere song owing to Green Bug) I was told Sprayers are no good, and you should have seen the state they were in, with substituted leather valves, &c.!!! The coolies were struggling all day long with the poor machines!!!

Mr. Rogers' experience certainly makes Spraying an expensive nuisance, and would show Brushing to be the better method, in every way. What strikes me however as strange is this. He puts cost at Rs.20/8 per 1,000 trees. Suppose we deduct Rs.5/8 for material, this would leave Rs.15/- for labour or 60 coolies, so that one man would spray only 16/17 trees. Unless there is a satisfactory explanation which I do not recognize at present, it would seem as if the coolies here too were struggling with a damaged Machine.

The matter is of immense importance for those about to try treatment for Bug, and I am sure, Mr. Rogers will therefore not mind explaining away, what must be a difficulty to many more minds than mine.

Lastly, I would like to state that Mr. Nicholson depended much on Sunlight Soap, as an insecticide, and brought in the Rosin afterwards, owing to rains as he states, judging by printed matter I saw. You will notice that I have discarded soap altogether as unnecessary.

I would sound a note of warning about the use of any insecticide that chokes parts of the Sprayer and more so any compound of sulphur that will destroy the copper of the machines rapidly. For sulphur a special sprayer of lead must be obtained.

Yours faithfully,

(Signed) THOS. BROWN.

Coimbatore, 29th July, 1913.

THE MANAGING EDITOR,
Planters' Chronicle.
Bangalore,

Dear Sir,—With reference to the letter by your correspondent 'Stymied' in your last issue, we beg to state that we are not surprised, that he feels aggrieved that we have discontinued the practice of quoting prices of individual fertilisers in our current price-list, although we believe that after perusal of this letter he will come to the conclusion that it is quite as much in the interest of planters as well as in our own, that prices which are naturally taken as *current for the whole year* should not be inserted.

We take a few specific instances of fluctuations in price during the course of the past year. The first row of figures are the prices at which the season opened, the second those ruling after a time, and the third those at which the season closed.

	Rs.	Rs.	Rs.
Saltpetre	210	220	240
Nitrate of Soda	235	240	220
Bloodmeal	185	175	170
Bonemeal	80	85	75
White Castor poonac ...	70	75	70
Fish	60	55	60

It will be seen from the above that there are at times considerable fluctuations in price, and further that a decline is quite as likely as a rise. Again in our case, we issue our price list only *once a year*, and if we are to run the risk of fluctuations during the year, we have to fix such prices as will in our opinion meet the case. Whereas if we quote only against specific enquiries, and current prices happen to be below the prices ruling previously our constituents get the benefit of the lower price.

With reference to mixtures for which we quote, your correspondent's conjecture is quite correct viz., that the prices quoted cover a probable rise or fall in individual fertilisers during the year. And if he will kindly refer to the price lists published by large Manure Firms in Ceylon, he will find that their system and ours coincide exactly.

We would in conclusion thank 'Stymied' for writing to you in this connection, as it gives us an opportunity to explain the position in your columns, and we hope that he will not grudge the trouble of sending us a post-card for our current prices, and if he is pleased to place an order with us, it will give us much pleasure to supply him with individual fertilisers so that he can enjoy the 'harmless pastime' of making his own mixtures.

Yours faithfully,
For T. STANES & Co., Limited,
(Signed) F. J. STANES.

Munderi Estate,
Pandalur P. O., 30th July, 1913.

THE EDITOR,
The Planters' Chronicle,
Bangalore.

Dear Sir,—I have just received a letter from Mr. Anstead to which I have replied, but the questions raised by the Planting Expert, have set up a train of thoughts in my mind which I venture to place before you.

The subject is the existing state of combination in the Planting Community. The position at present is, that we have a central organisation (the U. P. A. S. I.) which is subdivided into several District Associations, the initial mistake in my opinion, for each District Association is admittedly formed to primarily improve local conditions and undoubtedly has a tendency to perform its functions from a purely local point of view.

Next from a perusal of the reports of the various District Associations published in the *P. C.* for 1913, I have been struck by 2 points :—

1. The almost complete absence of practical suggestions, results and records of experiments and general treatment of the really important matters in planting.

2. The consequent attention paid to minor and unimportant details connected with individual estates, which do not appear to require the intervention of an association or any representative body.

Further, we have the parent association and all its various offspring, yet the support afforded them is I am compelled to think of a very lukewarm nature, as evidenced by the almost complete absence of original articles in the *Chronicle*, which appears to be supported entirely by yourself, the Planting Expert and Press cuttings. We are frequently adjured to "think Imperially" and if we combined it with "thinking agriculturally" the community would I think be much the better for the addition. Another point and I conclude my criticisms. A great deal of *undue* prominence at this period in the existence of the Association is given to the Labour Question, and my reasons for this assertion are briefly.

1. Conditions vary to such a large extent on estates that a uniform system of recruiting labour must be extremely difficult to devise, and consequently any proposals *e.g.* Registration of maistries, abolition of Recruiters, &c., are promptly met with protests or silent determinations to ignore any particular regulation which does not suit the individual.

2. The Planting Community at present do not appear to be educated up to the absolute necessity of uniformity, and in this connection I am reminded of a statement of the present Foreign Secretary in referring to Mr. Norman Augul's book "The Great Illusion" He said "True as the statement in that book may be it does not become an *operative motive* in the minds and conduct of nations until they are convinced of its truth and it has become a *commonplace* to them." Substitute "planters" for "nations" and you have the present situation. The truths in connection with the Labour Question are not yet *commonplaces* to Estate Managers and Superintendents, and consequently they have not acquired the force of "operative motives."

As I do not wish to assume the rôle of an arm-chair critic, I venture to make a couple of suggestions which I am of opinion will improve matters.

1. The appointment of *travelling* Assistant Secretaries whose sole duties would be to visit estates, confer with Superintendents and Managers, record their suggestions and in their place make suggestions. Personal intercourse of this nature will bring many a Superintendent to a broader sense of his responsibilities, and again many a man who, to use an expressive vulgarism, "breaks out into a cold perspiration when a pen is put into his hand" would be enabled to express and exchange his views which at present he does not do.

2. My concluding suggestion is a very radical one, and is in connection with the Labour Question. I suggest that the U. P. A. S. I. organise a Department, and undertake the functions of a Labour Recruiter. The sooner we realise that the Labour Recruiter is an evil that we cannot completely eradicate and cease to pass resolutions deprecating his existence but not suggesting how to obliterate him, the better for us. The Labour is available, so why should not the Association and individual planter get the benefit of the commissions paid, by forming ourselves into a Labour Recruiting Agency, under the control and direction of the Association. The only essential to the success of such a scheme is organisation, and surely we can find enough experienced and intelligent men in the planting community to ensure this.

Yours faithfully,

Signed) N. O. S. Barnard,

Superintendent.

P.S.—My knowledge and opinions are based on :—

1. 3 months experience as an Estate Superintendent.
2. Perusal of the *Chronicle* for 1913 and articles in the press,

3. Intercourse with a few brother planters. My argument and defence in placing my views before you are: (1) if wrong, the sooner I know it the better, (2) if right or feasible no good accrues from delaying expressions.

The EDITOR,
The Planters' Chronicle,
Bangalore.

Dear Sir,—With reference to "South India's" letter which appears in your issue dated 26th July, the advertisements from the Ceylon paper he quotes, do not justify the arguments he bases upon them. No. 1 is a list of coolies who have given legal notice to quit. There is no legal remedy whatever against them in Ceylon, where Kanganies and coolies are exempt from imprisonment for debt; as to the advertiser's motive in spending so much money on the advertisement, it can only be divulged by himself. No. 2 shows very plainly that the coolies mentioned were dissatisfied with some condition of their existence. This also probably can only be divulged by themselves. There is a legal remedy against them, as they are liable to imprisonment for leaving without notice. They could have given legal notice, remained another 31 days on the Estate, and then walked off scot-free; that they chose to risk imprisonment rather than remain another month on the Estate, speaks for itself. Is this a good advertisement for Ceylon? Does it show how perfect are the conditions of labour? Is it calculated to attract labour to the Island? "South India" is not the first man who has advocated Advertisement and Government legislation. In the case of our rivals across the seas, I admit advertisement has been eminently successful. As regards Ceylon, Government legislation has not prevented crimping, indebtedness, bolting, or any other evil from which planters in South India may be suffering. In Malaya, the effect of Government legislation in doubtful. I saw, a fortnight or three weeks ago, a speech by Mr. Talbot in London, (whose long practical Experience and tried wisdom, coupled with the fact that he is now the Director of Companies both in Ceylon and Malaya entitle his opinion to acceptance by any of us whose experience is not yet ripe) in which he pointed out that Government legislation in Malaya was not always so successful as had been claimed for it.

Yours faithfully,
(Signed) HERMIT-CRAB.

The EDITOR,
The Planters' Chronicle,
Bangalore.

Dear Sir,—I read the letter from "A Curer" in your issue of the 2nd instant with interest.

As he is anxious to supply information on the subject, perhaps he will explain why at the beginning of July my Curers sent me a Rebate on Shipping Charges for the years 1911, 1912, and 1913, with an apology for the omission to send them earlier?

Yours faithfully,
(Signed) "SLEEPING BROTHER.

A Crimping Letter.

The following is the translation of a letter written to a coolie on the Estate of a member of the Nilgiri Planters' Association, and the Editor has been asked to give it prominence in his columns. ED.

Royapettah, 28-7-1913.

To Kullan,

I have just come from Penang. I am employed in Penang as Manager of an estate. That estate is a very healthy place. I am intending to go back to Penang about the 15th of August or so. Do you like to come to Penang with me? Are there any others who could accompany you? There the pay is Rs.21 per mensem. There is no agreement if you come along with me, whenever you like you can return at the same time. You know well how I would protect you being the Manager of the estate. I am intending to take about 100 coolies along with me, and to prove to others what better workmen are my coolies—than the other coolies.

The working hours on the estate where I am Manager are from 5 a.m. to 2 p.m.

Let me know at once on receipt of this letter whether you are willing to come to Penang and how many others would accompany you.

(Signed) B. D.

COFFEE.

The terminal market has shown some rather wild fluctuations, advancing as much as 2*s*. 6*d*. per cwt. in a day, only to lose about the same on the next day. Rumours of financial trouble in Brazil led to the first selling, and on this being denied, a rapid advance took place, to be followed by further bear selling, but without any fresh news as to the crop, which alone should influence prices. In most quarters it is felt that the fall has been too rapid, and judged by the statistical position there ought to be some recovery, the only point which could influence values being the size of the next crop, and that will be better gauged in another month or two, when it is seen at what rate it is being sent forward. Mild Coffee has been almost neglected, and even the very low rates accepted by some merchants, who apparently were forced to sell, have not always led to business, as the demand from both the Continent and the home trade is exceptionally slow. Fine Costa Rica and fine East India fully maintain their values as the quantity offered is much below the usual at this time of year.

LONDON COFFEE RETURNS.

	*Home Consumption.		Export.		Stock.	
	1913.	1912.	1913.	1912.	1913	1912.
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
For week ended June 14th ...	322	292	380	1	16,451	13,405
For 24 weeks ended June 14th ...	7,599	7,581	8,751	8,298	—	—

* The Home amount contains a proportion for Export delivered by cart.
—*The Produce Markets' Review.*

RUBBER.

The Plantation Rubber Industry.

by

CYRIL E. S. BAXENDALE.

A Paper Read at the Third International Rubber Conferenee, held in New York, 1912.

(Continued.)

CULTIVATION.

Planting is done either from stumps or seed at stake. In the former case, the plants are taken from the nursery, being then from 6 months to 2 years or even older, cut to a length of 3 to 4 feet, the roots hacked back and then planted in the holes previously prepared for them. It says much for the vitality of the *Hevea* that it usually survives this drastic treatment and starts to sprout afresh, within a month, if the weather is propitious. From this time on ensues a battle between the planter and the original jungle, which endeavours to regain possession of the land. Numerous kinds of obnoxious weeds—coming from Heaven knows where—also make their appearance.

From time to time there crops up something almost as bad as weeds. I refer to the wearisome controversy as to whether it is not desirable to allow grass to grow or to cultivate some cover plant which will extinguish the weeds There are one or two cover plants which do not cause any permanent damage and have even proved beneficial on some plantations, when they have lacked sufficient cash to maintain a proper upkeep and when the only alternative was abandonment I have experimented with small areas under grass, but the results have not shaken my belief in clean weeding, to be followed by digging or ploughing whenever there is a sufficiency of funds and labour. With a sufficient supply of these sinews of war, the planter can hold his own and after three or four years, aided by the shade then afforded by his trees, he becomes master of the situation.

THE HARVEST.

The longed-for harvest then occupies his attention; and now-a-days his thoughts turn, naturally enough, to the curing factory. When I started tapping, the word factory had not been invented, or, at any rate, used in this connection. I began by settling the latex in my washing basin, rolling the rubber with a beer bottle (an empty one) and drying it on the veranda. Then acting under strong domestic pressure, I moved the scene of operations to the stables, and carried it on there until there was no room for the horse. Next I built a little shed and bought a hand mangle. The next move was to the factory of to-day.

COST OF PRODUCTION.

You will, I think, be interested to hear something about the cost of production. We planters are frequently twitted about our old promises of cheap production and these are compared with actual costs, which in some cases exceed 60 cents (U. S. A. currency) a pound. The twitting, curiously enough, was most severe when rubber was worth from two to three dollars, at which time we had to pay an ad valorem export duty and charges, based on these extremely high prices.

(To be continued.)

The Planters' Chronicle.

RECOGNISED AS THE OFFICIAL ORGAN OF THE U. P. A. S. I., INCORPORATED.

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THE U. P. A. S. I.

(INCORPORATED)

Contents.

The Scientific Department publishes an article on Die Back disease of Hevea, and draws the attention of those who require Monkey Jacks to the fact, that copies of the latest catalogues have been sent to the Honorary Secretaries of the District Associations. There has recently been a good demand for these.

The proceedings of four well attended District Association Meetings are published: Those of South Travancore, Mundakayam, Anamalai and South Mysore.

The F. M. S. Government are proposing to bring in a new law for the protection of trees, plants and cultivated products from disease and plant pests.

Correspondence again takes up a considerable space, and we but re-echo Mr. Danvers' hope that "this has come to stay." Letters similar in tone and matter as written by Mr. Danvers, will be very welcome to all our readers. We wish to encourage the discussion of all planting matters in our columns, and the example set by Mr. Danvers will, we hope, be continued, not only by men of wide experience, but by the younger generation.

"Curer" asks two pertinent questions from "Sleeping Brother" requiring replies, which we trust will be forthcoming.

Under the heading of *Green Bug* we publish a letter which makes a suggestion as to another way of getting rid of this pest.

The Planting Expert replies to Mr. Danvers' questions about composts, and the table accompanying his letter is very convincing.

In this number is completed Mr. Baxendale's interesting paper at the New York Exhibition. Read as a whole, it should be interesting to those Rubber Planters who will be attending the Annual Meeting, raising as it does many points for discussion and reflection.

The Secretary hopes, that during the Annual Meeting he will be able to arrange for a demonstration of the use of dynamite in planting. Through the kindness of Mr. Krumbiegel, Economic Botanist, the Secretary hopes to have the demonstration at the Lal Bagh.

THE SCIENTIFIC DEPARTMENT, U.P.A.S.I.

Die-Back Disease of Hevea.—Several specimens of this disease have been sent in this year. It attacks the pods of the Hevea causing them to rot and fall off and this is often followed by the death of the young branches and an attendant leaf fall. The disease is caused in the first place by a fungus known scientifically as *Gloeosporium alborubrum.* Green shoots of Hevea are often killed by wind. but when this is the case they die back from the tip. The fungus nearly always attacks the shoot at the middle of its length. The place attacked becomes dark brown and this discolouration gradually spreads and the leaves fall off as the diseased area reaches them. This fungus in itself does little harm as new shoots are put out, but it is apt to be followed by a second fungus, *Botryodiplodia theobromae* which gains an entrance to the tree through the dead wood caused by the *Gloesporium*, and in extreme cases this can kill the tree. The combination of the two fungi is the disease usually called 'die-back.' It is advisable to cut off and burn all the dead shoots as soon as they are noticed and to collect the diseased pods and destroy them. In many cases no doubt the death of the green shoots leads to nothing further, but the *Botryodiplodia* is a very common fungus on dead wood of all kinds and it is advisable to adopt precautionary measures. A detailed account of the disease will be found in Petch's book "The Physiology and Diseases of Hevea brasiliensis."

Monkey Jacks.—On a number of estates it is found advisable when removing shade trees to take out the stumps at once so as to avoid all risks of subsequent root diseases attacking the surrounding crop. For this purpose the Trewhella Monkey Jack is largely used and has generally given satisfaction. A new catalogue has recently been received from this Firm and copies have been sent to the Honorary Secretary of each Planters' Association. Those who are thinking of buying these Jacks should apply to the Secretary of their district association for the catalogue. The Manager writes me that they are now making a new implement, the Monkey Winch, an enormously powerful tool which under some conditions at least promises to be even a greater success than the Monkey Jack. He has kindly sent me a few catalogues of this implement. and I shall be pleased to send these to anyone who cares to see them, or to obtain for them any information they require from the Firm.

In the *Diplomatic and Consular Report* on Russia for 1912 the Consul General says that in 1911 he called attention to the falling off of the Russian consumption of China tea in favour of Indian tea. About 30 per cent of the total imports both in 1911 and 1912 came from China. There was an increase of imports from Calcutta and a decrease from Colombo. The import of Green Tea fell to less than one half of the 1911 imports, not so much from decrease of consumption, but because the consumption for 1911 had been overestimated and large stocks were left in hand.

Import of Tea into Russia.

Black.

From—	1911.	1912.
London	... 7,369,300 lbs.	8,009,500 lbs.
Calcutta	... 27,200,400 „	36,297,600 „
Colombo	... 25,868,800 „	21,229,000 „
Java	... 4,278,600 „	2,615,500 „
China	... 27,636,300 „	30,561,600 „
Total	... 92,353,400 „	98,713,200 „

R. D. A.

DISTRICT PLANTERS' ASSOCIATIONS.

South Travancore Planters' Association.

Proceedings of the 3rd Quarterly Meeting held at the Quilon Club on Saturday, July 26th, 1913.

PRESENT.—Messrs. Chas. Brander (in the Chair), T. P. Alexander, E. Lord, A. V. Con, H. S. K. Morrell, Chas. Hall, J. B. Cook, E. C. Sherman, R. Ross, L. G. Knight, J. Stewart, S. Sinclair, L. M. Young, J. H. Parkinson, Val. Mardon, and H. C. Seymour, Honorary Secretary. *Visitors*:—Messrs. R. C. Milbank, E. Smith, J. Mackie, J. L. Henderson, W. Clare. and W. Murray.

Agenda Paper.—1. Confirm Minutes of the last meeting. 2. Election of a delegate for Bangalore. 3. To settle a date for the visit of the Scientific Officer to the district for 1913. 4. Vadaserikara-Sittar Road and correspondence anent the same. 5. Mr. J. B. Cook's resolution :—"That the standing Committee revise the rules and draft a memorandum of the suggested alterations and additions and that a copy of such memorandum be sent to every member of the Association at least one month before the next Annual General Meeting." 6. Correspondence and any other business properly brought before the meeting.

The Minutes of the last meeting being confirmed, the next item on the agenda was then dealt with, namely that of electing a delegate for Bangalore. Mr. Cook who was elected delegate at the meeting held in April, was unable to go. Proposed by Mr. Cook and seconded by Mr. Val Mardon: "That Mr. Parkinson be asked to represent this Association at Bangalore." Mr. Parkinson consenting, Mr. Stewart proposed: that owing to the distance the delegate for this Association has to travel that he be allowed actual expenses up to Rs. 200 by this Association. This was seconded by Mr. Lord.

Scientific Officer.—Mr. Stewart proposed and. Mr. Ross seconded "that the Bangalore delegate be instructed to ask for the services of the Scientific Officer on or about October. 25th and that a programme of the estates he shall visit be drawn up by the Committee."

Mr. J. B. Cook's resolution was then put to the meeting and seconded by Mr. Stewart. the Standing Committee being asked to revise the rules.

Vadaserikara-Sittar Road.—As this item was of a semi-private nature Mr. Cook proposed and Mr. Lord seconded "that the Correspondence be placed officially by this Association before the Chief Engineer, D. P. W. of Travancore."

Correspondence.—A letter was read from the Kanan Devan Planters' Association asking this Association to support them in a protest to H. H. Government against any further labour legislation.

After a lengthy discussion it was proposed by Mr. Lord, seconded by Mr. Knight "That this Association strongly support the Kanan Devan P. A. in a united protest to H. H, Government against any further labour legislation."

There being no further business to be conducted, the Meeting terminated with a vote of thanks to the Chair and also to the Quilon Club for the use of its buildings.

(Signed) HUGH C. SEYMOUR,
Honorary Secretary.

Mundakayam Planters' Association.

Minutes of the General Quarterly Meeting of the Mundakayam Planters' Association, held at Peravanthanam Bungalow on Saturday, August 2nd, 1913 at 10 a.m.

PRESENT.—Messrs. R. Harley (Chairman), B. M. Behr, E. S. Conner, R. D. Fuge, E. R. Gudgeon, Eric Hall, Ashton Hamond, J. Y. M. Henderson, C. W. Horsfall, H. M E. Howson, R. Lescher, C. Martin, R. C. Milbank, H. B. Kirk and Edwin Vincent (Honorary Secretary). *By proxy*: E. Wilson. *Visitors*:—Messrs. W. A. J. Milner and T. M. S. Henderson.

Business:—The Minutes of the last meeting were taken as read.

1. *Election of a Committee Member.*—Mr. B. M. Behr, was the only nominee and he was unanimously elected to the vacancy on the General Committee.

2. *Election of a Finance Committee.*—In accordance with the resolution passed at the last meeting, a Finance Committee was elected to discuss the disposal of the Association's surplus Funds. Messrs. R. Harley, B. M. Behr, and H. B. Kirk were elected.

3. *Bangalore Delegate.*—The Chairman suggested that this year two delegates should be sent to the U. P. A. S. I. Annual General Meeting at Bangalore, and of three nominees, Messrs. Ashton Hamond and the Honorary Secretary (Mr. Edwin Vincent) were elected.

4, *Instructions to the Delegates.*—The Delegates were instructed as follows:—

Scientific Department.—To support all suggestions for increased efficiency, excepting those of a financial nature which should be referred to the Association for its decision.

P. B. F.—To ask for yearly statements of accounts to be sent to patrons of the Fund.

Election of Office Bearers.—To nominate Mr. J. A. Richardson as Committee member.

5. *Building Rates.*—Mr. Harley said that in sending our rates some errors have crept in and proposed sending the list back for revision. The Rates will then be printed and sent to every member.—*Carried.*

6. *Bandy Shelters.*—The Chairman said that since the establishment of Mundakayam as a town, no bandies were allowed to rest on the highway, and in the absence of any specified places for shelter, this was causing great inconvenience and hardship to bandy-men. He thought the rule also applied to the whole way between Kottayam and Mundakayam. He proposed that Government be approached by the Association and asked to lay off places where bandymen could draw up and that shelters be erected at these places for bulls. Mr. Behr seconded the proposal which was carried unanimously.

7. *The Mundakayam Post Office.*—Mr. Behr proposed that the U. P. A. S. I. be asked to address the Postmaster-General with a view to improving the postal arrangements in the District, Seconded by Mr. Hamond.

The Honorary Secretary pointed out that he was corresponding with the Postmaster-General who was giving the matter his attention, but nothing had been done. Mr. Harley proposed as an amendment: - that the Postmaster-General be again approached. The amendment was lost and Mr. Behr's original resolution was carried.

8. *Oil Fuel.*—Mr. Hamond proposed and Mr. Howson seconded that the Honorary Secretary be asked to write to Messrs. Shaw Wallace & Co's agents, with regard to the establishment of a liquid fuel depôt in Mundakayam, and that Peermade Planters be asked to support such an establishment, *Carried.*

9. *The Scientific Officer Scheme.*—The Honorary Secretary read a letter from Mr. Richardson suggesting, that should the Scheme go through, the Scientific Officer should be quartered on the Government experimental plot at Periyar. As no reply had been received from Messrs. Harrisons and Crosfield as to whether they would join or not, it was proposed that Mr. Richardson's proposal be negatived awaiting Messrs. Harrisons and Crosfield's decision. Proposed by Mr. Kirk and seconded by Mr. Lescher.

10. *The Kodimatha Landing Stage* —On Mr. Hamond's proposal it was decided to approach the Kottayam Town Improvement Committee on the subject of the inadequate space of the Public Landing Stage at Kodimatha, Kottayam.

11. *Correspondence.*—Read letter No. 7326 L. R. F. from the Chief-Secretary to Government with extract of Government Proceedings stating "The hours prescribed by the Government for all Offices and Courts in the State, are from 11 a. m. to 5 p. m. on all days except holidays."

As Government assumed that the prescribed hours of attendance are being adhered to, Mr. Kirk stated his experience, that whereas the hours of court at Kanjirapalli were from 10 a. m., to 3 p. m., at Peermade the hours were from 11 a. m. to 4 p. m.

Read P. W. 3337/165 of 08 from the Chief Secretary to Government on the subject of improvements to the Kottayam-Kumili road. No discussion.

Read 5456/L. R. F. from Chief Secretary to Government on subject of cattle disease in Mundakayam. No discussion.

Read letters from the family of the late Mr. R. A. Fraser thanking the Association for its vote of condolence.

Read letter from Messrs. Spencer & Co. with regard to the establishment of a hotel at Muttoncherry, Cochin. The Meeting did not think a hotel in Muttoncherry would receive much support from the local planters.

With votes of thanks to the Chair and to Mr. H. B. Kirk for his hospitality, the meeting then terminated.

(Signed) R. HARLEY,

Chairman.

(„) EDWIN VINCENT,

Honorary Secretary,

Anamalai Planters' Association.

Proceedings of a Half Yearly General Meeting of the Anamalai Planters' Association held at the Valparai Bungalow at 11 a.m. on Friday, 25th July 1913.

PRESENT.—Messrs. C. R. T. Congreve, A. C. Cotton, Geo. L. Duncan (Chairman), R. Fowke. E. N. House, C. Howland, J. H. Ireland-Jones, J. E. Sampson, E. W. Simcock, M. B. Pollard-Urquhart. J. H. Robinson (Honorary Secretary.

The Minutes of the Annual General Meeting held at Kalianapandal Bungalow, on 27th February last, were confirmed.

1. *Accounts.*—The accounts for the half year were laid on the table.

2. *The Annual Meeting of the U. P. A. S. I.*—Messrs. Duncan and Congreve were appointed as Delegates. The Agenda paper was gone through, and instructions on the various items were given to the Delegates.

The retention of the Scientific Officer was strongly advocated.

The Meeting were of opinion that not nearly enough time was given at the Annual Meeting of the U. P. A. S. I. to Labour matters and sincerly trusted that something definite would be settled this year to check unscrupulous outside Labour Agencies enticing away our labour from our Estates.

The Meeting also strongly advocated the backing up of any Scheme which might be formed that would, in any way, prevent advanced Labour from leaving the country and also urged the necessity of having all Recruiting Agents Licensed.

3. *Labour.*—This all important subject took up the greater part of the Meeting's time. Both Mr. Nicolls' and Mr. Waddington's schemes for the "Registration of Maistries" were put before the Meeting.

The meeting contended that Mr. Nicolls' scheme did not go far enough and that it would be quite beyond the powers of Honorary Secretaries of Associations to give up the time necessary for the working of such a scheme.

Mr. Waddington's scheme was most favourably received by the Meeting and the following resolution was adopted and carried unanimously:—Resolved: "That the Delegates to the U. P. A. S, I shall strongly support Mr. Waddington's scheme for the Registration of Maistries; but, at the same time, that the meeting is of opinion that the Registration of Finger Prints in conjunction with the scheme, is absolutely essential, and that the Finger Prints of the Maistries should be registered in acid on the back of fhe Metal Number Tickets that would be issued by the Manager of the Central Office to the different Maistries."

The District Magistrate wrote saying that Government had suggested that the provisions of the Madras Planters' Labour Act of 1903 should be extended to all Planting Districts and requesting to be advised whether this Association was in favour of ths proposal.

As the Meeting was not unanimous on the subject, it was proposed by Mr. Simcock and seconded by Mr. Congreve: "That the standing Committee convene a Meeting, at an early date, to consider the matter and to give the District Magistrate the Association's reply to his letter."—*Carried unanimously.*

4. *Fertilisers.*—The subject was discussed, under that heading on the U. P. A. S. I. Agenda, and Delegates were instructed to bring up a resolution, or to support any such, which would help to suppress adulteration and thereby lessen the loss in cost of transporting useless material from long distances to our Estates.

5. *Access to New Estates.*—The Collector's letter No. 585/sub. of 10 dated 10th June 1913, was put before the Meeting. It was understood from this letter that the Collector was not in sympathy with the planters upon this most important matter, and in view of the same, the Meeting was of opinion that the only thing now that could be done was for those persons requiring access fo their New Blocks to get private concessions, or proceed as laid down in G.O. No. 2969 dated 3rd Octoder 1912.

6. *District Transport.*—It was decided to await further estimates for the proposed Aerial Ropeway into the District.

The District Forest Officer's letter No.1149/sub 13 of July 5th 1913. proposing that all estates should use the same printed form for Brake-pole passes was read to the meeting. All the members present agreed to adopt the same form of Pass for Brake-poles.

7. *Medical* —The Meeting listened with surprise to Major Long's letter, No.2452 of 13 dated 17th July 1913, especially as both the District Medical Officer and Collector had inspected and approved of the Stanmore Bungalow as temporary quarters for the Sub-Assistant Surgeon.

The Honorary Secretary was directed to address a strong letter to the District Medical Officer on the subject.

At the request of Mr. Marden, the status of carpenters in regard to payments made to the Sub-Assistant Surgeon for attending on them, was inquired into. It was unanimously agreed that carpenters should be paid for at the same rate as that allowed for coolies.

8. *Pollachi Rest House.*—Mr. Duncan informed the Meeting that he heard from the Sub-Collector that steps were being taken to have matters remedied.

9. *Cooly shelters on Ghaut.*—No further information about these very necessary shelters had been received from Government. As the matter was such an urgent one, the Honorary Secretary was requested to write to the Collector, and inform him, that if Government gave the Association Rs.1,500 to build two shelters on the Ghaut, the planters themselves would erect the shelters, the building of which should be left to their discretion. and that if the buildings should cost more than Rs 1,500, the Association would meet the excess, and also that the Association agreed to pay for the annual upkeep of the buildings.

10. *Postal and Telegraph.*—Recorded that Mr. Duncan required the building in which the postal affairs were now carried on from the 1st April 1914, and that he would give notice of the same to the postal authorities.

11. *Magistrate for the District.*—It was recorded that Government could not appoint a Special Magistrate for the district for the purpose of issuing Warrants under Act XIII of 1859.

Warrants have to be taken out in Pollachi. This is found to be most unsatisfactory. Maistries are given money to go down to issue warrants, they remain for days off the Estate, often spending the money and not taking out any Warrants.

Should Warrants be issued, Maistries have to attend the Pollachi Court which means that *more* money must be given them, and another lengthy period is spent away from their work.

It was therefore proposed by Mr. Howland and seconded by Mr. Jones:— "That this Association request Government to depute the Sub-Magistrate of Pollachi to hold a Court for a few days every month at Tyerpadi, for the purpose of issuing Warrants and for trying cases falling under the Breach of Contract Act." Carried unanimously.

New Members.—The following were elected Members:—Mr. R. Michaelson-Yeates.—Proposed by Mr. Robinson, and seconded by Mr. Congreve.

Mr. R. Brierly—Proposed by Mr. Fowke, and seconded by Mr. Pollard-Urquhart.

The Meeting were sorry to record the loss of Mr. B. A. Marden who had lately left the district to take up his new appointment.

With a cordial vote of thanks to the Chairman for presiding, the Meeting terminated.

(Signed) GEO. L. DUNCAN,
Chairman,
(„) J. HATTON ROBINSON,
Honorary Secretary.

South Mysore Planters' Association.

Special General Meeting held at Lingapur on August 1st 1913.

PRESENT.—Messrs. W. L. Crawford (Chairman), D. Jackson, C. Lake, C. J. Hayward, H. F. Anderson, C. K. Pittock, T. Anderson, E. V. Hunt, K. Thammayer, W. F. Scholfield, M. J. Woodbridge, (Honorary Secretary) G. N. Frattini, Scientific Officer, West, L. Hill, *Visitors.*

Instructions to Delegates to U. P. A.—The draft agenda of the U. P. A. was gone through and all subjects of interest to this Association were discussed, so that the delegates should be able to get a general idea of the opinions of members on the various subjects to be brought up at the U. P. A. Meeting.

Introduction into Mysore of an Act similar to Act I of 1903.—Resolved. "That a referendum of all members of this Association be taken with a view to finding out if a majority are in favour of the introduction into Mysore of an Act similar to Act I of 1903." Proposed by Mr. C. K. Pittock and seconded by Mr. H. F. Anderson and carried.

Arsikere-Mangalore Railway.—The copies of correspondence on this subject were placed before the meeting and the following resolution put from the chair and carried: "That the South Mysore Planters' Association approach the Coorg Planters' Association for their co-operation in urging upon their respective Governments, the necessity of giving Mysore and Coorg direct access to the West Coast by a Light or Metre Railway to the port of Mangalore."

Seat on Hassan District Board.—After the Deputy Commissioner's letter No. 77/Mis. of the 17th July had been read, and preceding correspondence and records gone through the following resolution was carried without dissent: "That this Association after careful perusal of the Deputy Commissioner's letter No. 77/Mis. dated 17th July, 1913, is of opinion that no satisfactory explanation has been given to the Association, and our representative not being notified of the dissolution of the District Fund Board or of the failure to ask the Association to submit a name for nomination. as in the past; and is further of the opinion that in view of the records of past elections of representatives of this Association which have already been submitted to the Deputy Commissioner, an apparent slight has been passed on this Association and until an explanation is forthcoming, the Association is not prepared to submit the name of a member for nomination to a seat on the Board." The Honorary Secretary was instructed to send a copy of this resolution to the Dewan.

Election of Delegate to Dussera Representative Assembly.- Mr. C. Lake was elected.

Roads.—Proposed by Mr. C. Lake and seconded by Mr. C. J. Hayward that some of the roads in the Mulnaad being now in a worse condition than they have been for years owing to the neglect or incompetence of the Local Officials, the Dewan be written to, requesting him to take some steps to insure that the road repairs for which Government have budgetted for be carried out in an efficient manner.

Mail Service.—The Honorary Secretary was instructed to write to the Post Master General asking him to try and improve the Mail Service to Saklaspur.

The Honorary Secretary was asked to put on the agenda for the next meeting the subject of "Co-operation in the purchase of 'Fertilisers."

(Signed) M. J. WOODBRIDGE,
Hony. Secretary.

MALAYA AND AGRICULTURAL PESTS.

The F. M. S. Government is proposing to repeal the Coconut trees Preservation Enactments of 1898 in favour of a new law for the "protection of trees, plants and cultivated products from disease and plant pests." The stringent measures of the old Act against red and rhinoceros beetles are retained, but the new Act will considerably strengthen the hands of the authorities. For the above beetles, it is provided that trees attacked by these pests must be burned. The new Act will provide for the entry, on any land, and at any time, of the Inspecting officer for the purposes of examination; and he is empowered to remove by cutting. digging, or otherwise, such portions of any plant as he may think expedient to remove for the purpose of examination or investigation. In regard to compensation for coconut trees ordered to be destroyed, the Government safeguards itself by providing: "That the compensation in respect of any one tree shall not exceed five dollars; and that the compensation given in one year to any one person shall not exceed one hundred dollars." The scale of penalties range from five hundred dollars downwards, and the procedure in cases where owners fail to obey the orders of the Inspecting officer of the Supervisory Committee do not err on the side of weakness. In view of the agitation of the various Ceylon P. A.'s against the unsatisfactory nature of the Plant Pests Ordinance, and the growing prevalence of shot hole borer, some such more stringent Act would not come amiss in Ceylon.—*The Ceylon Observer.*

CORRESPONDENCE.

Olla Podrida.

The EDITOR,
The Planters' Chronicle,

Sir,—My thanks are due to Mr. Anstead and Dr. Coleman for their illuminating replies on the subject of the fertilisation of coffee. I see that developing self pollination after beginning as cross fertilisers is not necessarily retrogressive, though the examples referred to by Dr. Coleman would appear to have known better days.

I am afraid that I have no means of comparing the quality of the beans resulting from cross and self pollination, and imagine that nothing but very carefully conducted experiments can throw any light on this. In the field, so many circumstances would confuse the issue—manures, difference in season, pruning and nonpruning, etc. Even if I had any carefully preserved beans from a crop known to have been well visited when in blossom by bees and insects, and they showed no superiority to those of the present season (notably deficient in such visitors) I should be at a loss to judge the position; for my manures have been considerably changed, the season is abnormally favourable, and "who knows," as the coolies say, if the wind was blowing this year when blossom set?

In his article on composts Mr. Anstead omitted the cost of the cattle manure in sample B, which it seems to me should be added to the total given, as the full nitrogen content of the compost is taken. Even then this compost seems a very economical one. compared with poonac—and it would be of great interest if Mr. Anstead would work out for us the value of the phosphoric acid and potash contents too, as this would enable us to judge the amount of compost that would represent the manurial value of an ordinary dose of poonac, bone and potash mixture, thus possibly allowing us to distribute the bulk over a larger area than we might otherwise do. I have great faith in the value of organic matter, and would like to make it go as far as possible, without sacrificing efficiency.

While reading last week of the effect of manganiferous soils on pineaapple roots, these "having characteristic swollen tips, marking the cessation of the lateral growth of the roots, death and decay immediately following," I was reminded of a pineapple-looking bulb which I once pulled up to examine. It was partly buried in the soil, came out very easily, but was attached to a vigorous root which had pierced it just below the ground surface, and this root I traced back to a coffee stem. On opening the bulb (which was about 4 inch high by 3 inch diameter) I found that the coffee root had developed a swollen tip about the size of a cherry, and spongy looking; and it had evidently got just where it liked, and was imbibing the juice of the pineapple-marked bulb comfortably.

I presume this was a healthy bulbous root-end, developed to suit the delightful circumstances. If there had then been a Scientific Officer, he would have been asked to analyse the juice of that pineappley host.

It is pleasant to see the full use now being made of your columns for correspondence, and I hope that those who know will continue to instruct us who don't—and that we who want to know, don't you know, will continue to ask questions and extract information from those who can impart it. This was one of the chief ideas when the paper was started; and though it has been long in coming, one hopes it has come to stay.

Yours faithfully,
(Signed) C. DANVERS.

Freights.

11th August, 1913.

THE EDITOR,
The Planters' Chronicle,
Bangalore.

Dear Sir.—In your issue of the 9th instant appears a statement over the signature of " Sleeping Brother " which at any rate, so far as can be judged from your editorial notes, is anticipated to cause consternation amongst the Curing fraternity.

Before however the Bomb ? can be said to have accomplished its objective, I would ask " Sleeping Brother " one or two questions in connexion with the returns ? he annually ? receives :—

1. Was the rebate paid on shipping charges, or on freight ?
2. If on freight ? which Coast does he usually ship from ?

Yours faithfully,
" CURER."

Green Bug.

Waterfall Estate,
Pollachi, P. O.,
Coimbatore, 7—8—13.

The EDITOR,
The Planters' Chronicle.

Dear Sir,—After seeing so much correspondence in the " Planters Chronicle " about Pruning and Spraying for Green Bug, I am surprised to see that no one has mentioned such an important item as scraping of Coffee stems. As on this estate Green Bug was totally neglected for about seven years and last year after a careful pruning (not heavy) and a good scraping of stems, the Green Bug has disappeared and in place of the filthy black trees there is now a rattling good crop. Of course we have to go through September and October before I can say we are free from it.

My rainfall is 115 inches chiefly S. W. monsoon but a good splash of the N. E.

I am, dear Sir,
Yours faithfully,
(Signed) H. W. deSALIS.

Composts.

No. 697/1913.

Office of the Planting Expert,
Bangalore,
12th August, 1913.

THE EDITOR,
The Planters' Chronicle.

Dear Sir,—As Mr. Danvers claims that the cost of the Cattle Manure should be charged against the cost of making a compost, I must claim that the value of the Potash and Phosphoric Acid in the final compost must be credited to it, also the saving in transport as compared with an artificial manure containing an equivalent amount of plant food, a most important item.

Suppose we charge up the cattle manure as being worth 40% of the total cost of the making the compost, *viz.*, Rs. 63. This is I think a liberal allowance. We can then make out a sort of balance sheet as under.

Cost of making 50 tons Compost.	Rs.	Value of Compost.	
3 tons Bone Meal ...	285	1680 lb. Nitrogen @ 8 as. ...	840
Cattle manure ...	126	3214 lb. Phosphoric Acid @ 1 an. ...	201
Labour of making ...	20	3203 lb. Potash @ 2 as. 2 p. ...	433
Labour removing from shed to pit ...	10	Transport on 50 tons @ Rs.5 per ton ...	250
Total ...	441	Total ...	1624

This leaves a very considerable margin of profit.

With regard to Mr. Danver's second question one ton of compost A is equivalent to a mixture of 687 lbs. White Castor Poonac, 251 lbs. of Basic Slag and 79 lbs. of Sulphate of Potash, and one ton of Compost B is equivalent to a mixture of 560 lbs. of White Castor Poonac, 293 lbs. of Basic Slag and 105 lbs. of Sulphate of Potash.

This mixture for the case of Compost B would cost Rs. 36 per ton exclusive of freight, while as made and valued above the eqivalent Compost costs only about Rs. 9 and is worth about Rs. 33.

The application of both Composts should be at the rate of about one ton per acre to good coffee.

Yours faithfully,
RUDOLPH D. ANSTEAD,
Planting Expert.

TEA IN PERSIA.

The Diplomatic and Consular Report for 1912 on the trade of the Consular District of Bushire states that Tea occupies the third place of importance among merchandise imported to Persia. The total import to Persia was for:—

1910—11 ...	3,483 tons.
1911—12 ...	4,185 tons.

It is an export of the greatest interest to India yet the import to all Persia in 1911-12 was from and *via*: –

India ...	1,673 tons.
Russia ...	2,286 tons.
Dutch East Indies ...	160 tons.

Smuggling more especially from Bahrein to Tangistan on the Persian coast is on the upward trend and is said to be confined almost entirely to Indian Teas because chests from India arrive already wrapped in skins for protection from weather on the journey upcountry in Persia, while China and Batavian (Lamseh) tea is not so packed.

RUBBER.

The Plantation Rubber Industry,

by

CYRIL E. S. BAXENDALE.

A Paper Read at the Third International Rubber Conference, held in New York, 1912.

(Continued.)

CULTIVATION.

Then, as there were not quite enough experienced planters to go round, assistants, as well as managers, thought they would like to participate in the general prosperity and expected either larger salaries or else commissions. Our coolies also felt that what was good for master must bo good for man, and demanded either more pay or less work—generally both. Even the Government suffered from the prevailing spirit and on new applications increased the rent and charged a premium of the land. Shareholders often seem to forget to study the other side of the profit and loss account and to compare the price actually obtained against the price we figured on when estimating the cost of production. Moreover, we did not contemplate tapping our trees at four years old, at which age the rubber is naturally more expensive to collect.

I admit that I speak with prejudice, but it seems to me only right and proper that those responsible for supervision should enjoy some of the fruits of the industry, when the industry can well afford it. There are many other items of expenditure which will automatically decline when the value falls.

CLOSE *vs.* WIDE PLANTING.

I do not desire to encourage the expectation that the yields from our closely planted trees will approach that obtained from those first planted. The latter were usually planted at wide distances, and enjoy as much light and air as the heart of a tree can desire. Ten years ago, I collected 18 lbs. of rubber in 35 days from one of the trees planted by Sir Hugh Low; while from avenue trees of my own planting, 14 years old and 7 feet in girth, results have been obtained far in excess of those planted in the fields. It is for this reason that I am inclined to deplore references in published reports to yields *per tree*. All calculations should be based upon the yield per acre. Probably the average number of trees planted to the acre in Malaya is nearer 200 than 100, and thinning out is inevitable as the trees expand. Thus, your trees are an uncertain quantity, whereas the acre is always the same.

A well-known botanist who studied the *Hevea* in its native land used to urge us strongly to plant at 40 x 40 feet, *i.e.*, 27 trees to the acre.

The *Hevea*, like most quick growing trees, is extremely brittle; and, at this distance, would suffer severely form the wind, but if I allowed, for the sake of argument, that every tree reached maturity, I found by comparing the results from avenue trees against the results from closely planted fields that up to 8 years old I should have harvested less than half the quantity of rubber from the same area, had I adopted our botanical friend's advice.

It is true that I should have economised to a certain extent on the actual cost of collection but not sufficiently to compensate for the loss of rubber, Thinning out as the trees get older and require more space, has been opposed on the ground that the dead roots encourage the spread of disease. I have pursued this policy for several years past and cannot find that the fear is justified. Indeed, as the years roll on, I become less anxious about plant diseases and pests of all kinds. *Fomes Semitostus* (our worst fungus disease) and white ants (the most destructive of our insect pests) have lost their terrors for me now that I know how to keep them in check ; and as the loss from all causes on the plantations I am connected with does not average two per cent. after attaining maturity, I cannot, justly, be charged with "turning the blind eye" in that direction.

LABOR PROSPECTS.

The most plausible argument against the future output of plantations is that of shortage of labour. It is true that most plantations are at times short of labour, but I think this must generally be attributed to the Manager's desire to keep down expenses. Out of a total of 227,985 coolies employed on Malayan plantations 126,665 or rather more than half, were imported from India. The average period of service on the plantation does not exceed two years—although many of these return after a holiday in their native land ; and the difficulty is to engage during the recruiting season the exact number that are required to make good the probable departures during the rest of the year, without becoming burdened at the beginning with labour for which there is no profitable employment.

Within two years the plantation labour force has more than doubled. I do not believe that by increasing the rate of wages any great stimulus would be given to Indian emigration. Tamil coolies are more easily recruited for some plantation at half the wages paid on others which are unpopular, owing to unhealthiness or to some other cause ; and this fact is becoming more clearly marked, since those employed at the lowest rates have found themselves able to remit more than half their earnings to India, and their savings in three or four years are sufficient to establish them as capitalists when they return to their native villages.

The future success of estates which are unpopular with Indians will depend on the attractions they can offer to Chinese or Japanese. To these, the rate of wages is of more importance than any other consideration ; and there is practically no limit to the number that can be recruited—at a price.

It must be remembered that by doubling the cost of labour we do not double the cost of production. Generally speaking, the average cost of tapping is less than one-half the total cost of production, if we include home charges ; and as the majority of the trees now being tapped have barely reached half their full yielding capacity, labour rates can, if necessary, be materially increased without raising the cost of production, when the trees attain maturity.

MANURING.

Recently, some consideration has been given to the question of manures. From Ceylon some interesting results have been reported, but in Malaya little has been done in this direction, except on some estates where the soil is excessively rich in humus, and lime has been applied to correct the acidity, with good results.

My own opinion is that for some years to come, at any rate, systematic cultivation of the soil will be of more value than any manure, but the experiments in Ceylon are deserving of attention; and the Agricultural Department of Malaya, if they have not already done so, might study the question with advantage.

FUTURE SUPPLIES.

It has been suggested to me that you will be interested in an estimate of the supplies that are to be obtained from plantation sources, and it is obvious that a paper of this kind would be incomplete without it. It is not easy to obtain reliable statistics of the cultivation in all the tropical countries in which rubber is grown. Naturally, the yields vary considerably, and the high price has undoubtedly encouraged more vigorous tapping on many plantations than would have been considered advisable if the price had been less tempting. I know fields where from 800 to 900 pounds an acre have been collected for two or three successive years, but I question if such high yields can be maintained. A first-class, well-managed plantation may be expected to yield an average of 500 to 600 pounds an acre for as many years as our experience guides us, but we must assume a considerably lower average from all plantations. The area under rubber in the Malay Peninsula at the end of 1911 amounted to 542,877 acres, and as far as I can ascertain the total area under this cultivation in the world amounts to about 1,000,000, acres. We know that during the half year ending June, 30, 1912, the exports from Malaya amounted to 9,038 tons, and from Ceylon to 2,252 tons. Allowing for the out-put from India, Sumatra, Java, etc. I estimate the total output of plantation rubber will be from 25,000 to 30,000 tons for the whole year. The annual increase will be fairly steady, and at about six years from date, the production is likely to amount to 100,000 tons per annum or, in other words, equal the total consumption of rubber during the year ending June 30, last.

During the year ending June 30, (1912), with rubber averaging 5/2 (say a dollar and a quarter) a pound, consumption—according to the figures recently published by Messrs. Hecht—increased by 25,482 tons. I am aware that this statement has been challenged by other authorities. We are told that they are *eminent* authorities, but as they unfortunately published their views anonymously, we are obliged to take their word for it.

The most pessimistic of these that I have read, calculates the increase at about 14,000 tons, and if we accept this figure in preference to Messrs. Hechts' (I don't know why we should), and assume that this increase will be maintained, the requirement six years hence will amount to 184,000 tons, so that the struggle between plantation and wild rubber does not appear to be very imminent.

I have now told you as well as I can what I believe to be the immediate course of events. To you gentlemen, who are manufacturers, I would say this, whether our achievements will lead to prosperity for *our* industry will depend entirely on the growth of *your* industry. Speaking personally of my first few years' experience in tropical agriculture, I was engaged in planting coffee. At the outset of my career in this line, the price in local currency and weights was $40 a picul and I saw it fall to $16. This experience is put in the shade by that of my brother planters who were interested in pepper and cinchona. Our misfortunes were due to the fact that, an increased supply did not lead to any considerable increase in the demand for these products. We have yet to hear of anyone who shakes the pepper castor more vigorously over his potatoes owing to a slump in the price of pepper, or increases his dose of quinine because the quantity of chinchona offered at the auction sale is in excess of anticipations.

The future of the rubber industry depends on whether the planter can confidently anticipate manufacturers digesting the increased supplies.

A well-managed, favourably situated, mature plantation can produce with a handsome profit at 2/6 (60 cents) a pound. It must be remembered that the increased demand depends on the new uses to which it may be put, the increased demand for uses to which it has hitherto been put, and the supply demanded by making good the losses by wear.

As an illustration of what I mean, I will take the case of solid and cushion tyres which if not now, will perhaps shortly absorb more rubber than is used for any other purpose. If we assume that 1,000,000 of these tyres are used through the world this year, and only the same number next year, the amount of rubber required on this account will, other things being equal, be only that amount necessary to replace the loss involved by wear and tear.

The irregularity of the cost has undoubtedly militated against its use in some directions. For instance, I am informed that whereas electric light mains and leads were in the past invariably insulated with rubber, paper insulation has been substituted in many cases. Experts tell me that rubber is preferable for this purpose, and no doubt a number of instances will occur to you gentlemen, where it would be preferable, if the price admitted of this use.

This brings me to the crucial question from the planter's point of view, and a question which my present audience is in a better position to make an authoritative reply to than any audience previously addressed by a planter.

We can guarantee an enormously increased supply of rubber and will in future years be content with a much lower price than now prevails. What we want to know is whether there is to be a glut in the market, and a scramble to sell, with every successive increase in the supply. Perhaps, gentlemen, you can allay the misgivings of those planters with the weaker faith in the future of the industry, and can send them, through me, assurances which will encourage them to hope for a continuance, even if in a modified degree, of the prosperity we have recently enjoyed—a prosperity which, I believe, has never been rivalled by any agricultural industry in all the history of the world.—*The India Rubber World.*

BRAZIL.

The Acting British Consul-General at Rio de Janeiro (Mr. E. Hambloch) reports that the import trade of Brazil as a whole, and especially of Rio de Janeiro, is likely to undergo considerable modification in the near future. The purchasing power of the country is bound to be affected by the adverse conditions of the rubber and coffee industries. Whatever the future may have in store for Brazil as a producing country, the present purchasing power is created almost entirely by coffee and rubber. The financial situation, which is rightly regarded with considerable alarm by all thinking people in Brazil, is accentuated by the gloomy prospects of those industries.—*Board of Trade Journal.*

The Planters' Chronicle.

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THE U. P. A. S. I.

(INCORPORATED)

Contents.

The Scientific Department calls attention to the increasing spread in Coorg of Green Bug, and strongly advises planters to be ready to attack it during the coming hot weather; and uses the emphatic warning: "It is fatal to relax vigilance." The note is most interesting. The Planting Expert, through the kindness of Mr. Bainbrigge Fletcher, R. N., the Government Entomologist, is able to publish a list of insects which attack coffee. tea, or rubber.

From the Monthly Bulletin of Agricultural Intelligence and of Plant Diseases we extract a paper entitled "Study of Coffea Robusta." Just at this moment it is interesting to note that *corticum javanicum* (produced by *Lecanium viride*) and eel worms seldom or never attack robusta. The greatest precaution must be taken in the interests of all in importing seed. Daily it is becoming more apparent that a Pest Act is necessary in India.

Just when the Annual Meeting is taking place, we are able to publish two letters dealing with the Labour Question. which may or may not (in conjunction with other letters) help the assembled delegates to arrive at some solution of this thorny problem.

"South India" in his opening para, congratulates us on the increasing use made of our columns, and we have only to say, that we hope that these columns will be more widely used. They are open to all and sundry.

An answer from "Sleeping Brother" to "Curer's" letter of 16th, is published, which we hope will bring a fully explanatory reply from him.

A short article on Pepper is reproduced, which shows the advantage of cattle manure over oil cakes. Ground nuts appear to be the best green manure for pepper, and that leaf mulch and leaf mould have beneficial effects.

Almost all the Delegates have arrived for the meeting of 25th and most have called in at the office and helped Mr. Anstead to arrange the Exhibits, which are still continuing to come in.

THE SCIENTIFIC DEPARTMENT, U.P.A.S.I.

Scientific Assistants.—Mr. Jonas, the Scientific Assistant for Coorg who had been at Bangalore occupied upon special work for ten days or so returned to his District on 14th August. He is now occupied with the new outbreaks of Green Bug. Mr. G. N. Frattini, the Scientific Assistant for Mysore, arrived in Bangalore on 11th August and will remain at head quarters till after the Annual Meeting of the U. P. A. S. I. He is engaged upon the checking of fertiliser guarantees in the Laboratory.

Green Bug.—This pest is still increasing its spread in Coorg, and has appeared in a new area despite the monsoon conditions now obtaining. The statement which has several times been made in these notes, that rain alone, however heavy, will not kill it, finds ample confirmation in Coorg. Here it has broken out on new areas during the monsoon, and is bad on one estate which has had 80 inches of rain in two months. Hence it is evident that all mistaken notions that rain is going to kill it entirely must be abandoned, and it is fatal to relax vigilance and cease to take the necessary precautions against the spread of the scale. The more it spreads now, the worse and more general will be the attack during next dry weather.

With regard to the life history of the scale an important point has recently been observed. A young three year old tree with only one young scale on it was marked on 24 June, isolated (the plants round it being sprayed), and kept under observation. On 16 July the tree was covered with Scale and had to be destroyed. Hence under favourable conditions the period from egg to egg is about three weeks only.

Insect Pests in Southern India.—Mr. T. Bainbrigge-Fletcher R. N. the Government Entomologist, has recently issued for private circulation among his colleagues a *List of Insect Pests of Cultivated Plants in Southern India*, and he has very kindly granted us permission to extract from this list the insects affecting Coffee, Tea, and Rubber. In the Preface to the List, Mr. Fletcher says, "this List shows the principal crop pests of Southern India. It must be clearly understood that such a list does not purport to be complete and never can be complete, as new pests are constantly coming to light, but it is intended to serve temporarily the purpose of giving a list (in systematic order) of those insects which are at present known to do damage to crops in Southern India for the benefit mainly of Entomologists in and outside of India. It is hoped to issue illustrated Bulletins on the insect pests of the principal crops as soon as the necessary illustrations can be prepared. A Bulletin on Insect Pests of Paddy is in the press, one on Cotton Pests is written, and others are projected on Pests of Cholam, Mango, Coffee, &c. In the present list the localities given are those in which the various insects are known to occur, but this is not to be taken as meaning that these insects are not to be found in other Districts. "Throughout" means throughout Southern India in all suitable localities in the Plains and Hills. "Plains" means all suitable localities below an elevation of about 4000 feet, above which higher localities are denoted as "Hills." The "crops attacked" are those on which the insects are usually found as Pests, but other plants than those mentioned may be attacked occasionally. Under the head of "remarks" the status of the pest is usually given *i.e.* whether the particular insect is a major pest regularly causing considerable loss of the crop attacked, or a minor pest of regular occurrence but causing relatively inconsiderable damage. A sporadic pest is one that occurs occasionally but not regularly, and a local pest is one that only does damage in a limited area."

The following Insects in the List are noted as attacking Coffee, Tea or Rubber:—

Name.	Distribution.	Crops attacked.	Remarks.
Coleoptera			
Cerambycidae.			
Batocera rubus, L.	Throughout	Hevea Rubber	Minor pest usually
Xylotrechus quadripes, Cheor.	Hill Districts	Coffee	Major pest
Scolytidae (Ipidae)			
Xyleborus fornicatus, Eich.	Travancore	Tea	Minor pest
Lepidoptera			
Arctiadae			
Estigmene lactinea, Cr.	Plains	Cumbu, Ragi, Horse-gram and Coffee &c.	Local major pest of Cumbu
Creatonotus gangis, L.	Throughout	Groundnut, Lucerne, Coffee &c.	Scarcely a pest
Noctuidae.			
Euxoa segetis, Schiff	Submontane & Hill districts	Potato, Cabbage, Coffee &c.	Serious garden pest in Hills
Lymantriadae.			
Olene mendosa, Hb.	Bellary, Coimbatore and Shevaroys	Castor, Red-gram, Coffee	Minor pest
Nododontidae.			
Staturopus alternus. Wlk.	Throughout	Tamarind, Tur, Tea	Very rarely a pest
Geometridae.			
Biston suppressaria, Gn.	Tea Districts	Tea	Sporadic minor pest
Limacodidae.			
Parasa lepida, Cr.	Throughout	Castor, Mango, Coconut, Palmyra, Pepper, Tea &c.	Sporadic major pest
Zeuzeridae.			
Zeuzera coffeae, Nietn.	Hills	Coffee, Tea, Sandal	Minor pest
Zygaenidae.			
Heterusia virescens, Butl.	Nilgiris Wynaad	Tea	Sporadic serious pest of Tea
Psychidae.			
Clania crameri, Westw.	Throughout		do

Name.	Distribution.	Corps attacked.	Remarks.
Tortricidae.			
Homona coffearia, Nictn.	Tea districts	Tea	Minor pest sporadically serious
Hepialidae.			
Phassus malabaricus, Mo.	Nilgiris, Bangalore	Tea (roots) and probably various plants & shrubs	Doubtfully a pest
Rhynchota *Pentatomidae.*			
Antestia cruciata, Fb.	Throughout	Coffee	Sporadic serious pest
Capsidae.			
Holopeltis antonii, Sign.	Coimbatore. Hills	Tea, Cacao, Cinchona	Sporadic serious pest
Jassidae.			
Empoasca flavescens, Fb	Throughout	Castor, Tea	Very minor pest
Coccidae.			
Dactylopius citri, Risso.	Throughout	Coffee, Tea, Erythrina, &c.	Occasional serious pest of Coffee
Pulvinaria psidii, Mask.	Throughout	Mango, Guava Loquat, Coffee, &c.	Minor pest usually
Lecanium viride, Grn.	Throughout	Coffee, Guava, Loquat, Cinchona, &c.	Locally very serious pest of Coffee
Lecanium hemisphaericum, Targ.	Throughout	Tea, Coffee, &c.	Sporadic serious pest of Coffee and Tea
Lecanium nigrum, Nictn.	Throughout	Hevea, Tea, Coffee, &c.	Usually a minor pest on Rubber
Lecanium oleae, Bern.	Throughout	Coffee, Castilloa, Rubber, &c.	Minor pest of Coffee
Aspidiotus camelliae, Sign.	Hills	Tea, Cinchona, &c.	Occasional serious pest of young tea plants
Chionaspis biclavis, Comst.	Nilgiris	Tea, Cinchona, Coffee	Local minor pest
Hemichionaspis theae, Mark	Tea Districts	Tea	do
Acrididae.			
Aularches miliaris, L.	Probably throughout	Coffee, &c.	Rarely a pest

R. D. A.

STUDY OF COFFEA ROBUSTA.

For some years past, the qestion of *Coffea robusta* and of its cultural value has been dealt with in all Colonial Agricultural Journals. In this article, the writer has collected all the data, which seem favourable to a large extension of the cultivation of this plant. Already in 1909, he maintained, in a paper contributed to the *Annales du Jardin Botanique de Buitenzorg* (2), and containing an exhaustive bibliography of the cultivated varieties of *Coffea*. that *C. robusta* is not a species, but a variety or form of *Coffea canephora*, indigenous in Central and West Africa.

C. robusta when carefully cultivated, forms a shrub with horizontal or decumbent branches, which at the flowering and fruiting seasons, literally bend beneath the weight of the flowers and fruit. This productivity is one of the characteristics of the variety from the economic standpoint; for no other kinds of cultivated coffee plants bear so many seeds. Another important characteristic which must be dwelt on is its early maturity; it is full bearing long before *C. liberica* and *C. arabica* and before *Hemileia* has developed sufficiently to hinder its fructification to any noticeable extent.

But the success of *C. robusta* is especially due to the fact that it will grow between *Heveas* and to the economic results obtained by using it as a grafting stock (3)

UNITS OF YIELD.—The yield of this plant is one of the most remarkable; the following table published by the *Jaarbock* of the Department of Agriculture of Java, gives the crop from diffierent coffee plants of the same age and grown under identical conditions:

Java Coffee	53 to 97	grams
Maragogype	14 to 18	„
Moka (small berries) ...	27 to 38	„
Moka (large berries) ...	118	„
Robusta	992	„
Quillou	1020	„
Maragogype on Quillou ...	26	„
„ „ Robusta ...	156	„
Eugenifolia	20 to 133	„
Lancifolia	10	„
Erecta	43	„
Cochleata	12	„
Rotundifolia	40	„
Laurina	83	„
Unisperma	20	„
Columnaris	17	„
Augustifolia	60	„

The two African varieties, *Quillou* and *Robusta*, are the ones which give the highest yields, while *Maragogype* grafted on *Quillou* produces 26 grams of seed per tree and on *Robusta* 156 grams per tree, which is a larger crop than any produced by the cultivated varieties formerly grown in Java.

SELECTION.—An interesting question has been raised of late as to the flavour and commercial value of the coffee from the different varieties of coffee plants; this leads to a consideration of the necessity of improving the cultivated species and varieties by means of selection.

This is the more important, contrary to what has been affirmed respecting other species of *Coffea*, and especially by Dr. Von Faber as regards *C. Liberica*, seeing that self-fertilisation never takes place in the group of

Coffea canephora to which *C. robusta* belongs; cross-fertilisation is the invariable rule. This being the case, it is necessary to protect the plant from bad qualities being introduced by strange pollen. Very careful selection is therefore necessary to ensure good returns and, according to Dr. P. S. Cramer, attention must be directed to the following points:--

1. Growth, resistance to fungoid leaf deseases. ramification.
2. Annual production. early ripening of crop, distribution of flowering periods throughout the year.
3. Crops, proportion between good and aborted seeds, thickness of the testa of the fruit.
4. Shape, colour, size of the berries.

All selection work, however, presupposes a knowledge of the forms to be adopted and the value of their produce; unfortunately much confusion still prevails in these matters, as is shown by the different opinions summarized by the writer as to the determination and classification of the various kinds of coffee cultivated.

Mr. Wurth, of the Special Coffee Station at Java, divides the cultivated varieties of Coffee plants into 3 groups of which the types are *C. arabica. C. liberica* and *C. robusta*:

Arabica: *congensis, stenophylla,*
Liberica: *abeecuta, excelsa.*
Robusta: *canephora, Quillou, Uganda.*

Mr. Wildeman, on the contrary, considers *robusta* as a variety of *canephora*, and *Quillou* as identical with *C. canephora* var. *Sankaruensis* which together with *robusta* and *Laurentii* are a sort of *canephora* exported with the latter varieties from the Congo. At all events, if *Coffea arabica* seems to be variable, this is equally the case with *C. canephora*. and it is impossible yet to be sure whether the *Quillou* variety grown in Java is actually the *Kouilouensis* (Pierre), variety of *Canephora* or another African variety of the same species, or even a new local form derived from a plant introduced into Java. All these questions, which are of great scientific and practical importance, still remain to be solved.

CULTURAL EXPERIMENTS. In Java, the answer to these problems is being sought by means of comparative experiments of the greatest interest. The results of Dr. Cramer's study of the proportion of fresh fruit to the berries ready for sale are all in favour of the *canephora* group and therefore of Coffea robusta, seeing that 4 or 5 lbs. of its fresh fruit furnish, 1 lb. of berries. which in the case of *liberica* and *Coffea arabica* 7.85 to 15 lbs. and 5 to 6 lbs respectively are necessary to supply the same weight of coffee berries ready for the market.

Other experiments undertaken for the purpose of ascertaining whether the *Quillou* variety was suitable for planting on the sandy soils of Kloet in Java showed that:

1. In the majority of cases *Quillou* thrives as well as *robusta* in the Kloet nurseries and it is only very rarely more backward in growth than the latter.
2. Shortly after being planted out, both varieties develop equally well.
3. Until its second year, the *Quillou* variety grows a little less rapidly than *robusta* on the Kloet soil, but after this period it makes up for lost time and becomes as vigorous as the latter. Their value consists in the uniformity of the type.

4. Under the present conditions, the yield of *C. Quillou* on the soils of Kloet is less than that of *C. robusta* when grown in the same circumstances.

5. In the district in question *C. Quillou* is of less cultural value from a general point of view than *C. robusta.*

Other cultural experiments have, however, not given the same results. When the *Uganda*, *Robusta* and *Quillou* varieties are planted so as to compare them with each other and using *Leucoena glauca* as a shade tree if they are cut at a height of 5 feet and placed 10 x 10 ft. apart, they give, the following amount of coffee ready for the market.

Uganda	... 10·44	piculs per bouw	or about	800	lbs. per acre
Robustà	... 16·60	„ „	„	1,250	„ „ „
Quillou	... 21·21	„ „	„	1,600	„ „ „

CULTURAL METHODS AND SHADE PLANTS.—It is necessary to choose, by means of preliminary experiments, the variety of coffee to be cultivated; this, however, is not all, for the cultural methods most suitable to the given variety must be selected and the variety of shade plant to be used. The experiments of Mr. Boon in the experimental plantations of the Dutch East Indian Government at Bangalan, Java, show that the yield of the same variety varies with the shade plant employed.

Ratio of yields of cultivated coffee plants grown under the following shade plants:—

Solanum grandiflorum	*1·59*
Adenanthera pavonina	*1·82*
Colesalpinia arborea	*2·17*
Acacia tomentosa	*2·43*
Hevea brasiliensis	*2·77*
Albizzia moluccana	*2·82*
Pithecolobium Saman	*3·06*
Grevillea robusta	*3·49*
Erythrina lithosperma	*4·10*
Leucœna glauca	*4·75*

EXTENSION AND PROGRESS OF THE CULTIVATION OF C. ROBUSTA.

In order to obtain an idea of the popularity enjoyed in Java by coffee plants belonging to the *canephora* group, it is only necessary to consult statistics on the subject and especially those compiled by the Agricultural Syndicate of the Dutch East Indies. According to the latter, 24 521 000 plants of *C. robusta* have been planted in the 4 years from 1907 to 1911. The statistics of yield and of plantation communicated at a meeting held at Malang in May 1912, gave the following figures for plantations:

	1911 Crop.	1912 Estimate.	Plantations. 1911-1912.
C. *robusta* and spices of the same group	54,685 cwt.	94,312 cwt.	4,686,542 trees
Java	42,873 „	74,460 „	...
C. *liberica*	15,616 „	9.164 „	12,150 „
Hybrid	1,763 „	3,445 „	80,476 „

These few figures, although incomplete, seem to justify the opinion expressed by Prof. Treub, late Director of the Buitenzorg Botanic Gardens, that soon 60000 tons of Javanese Coffee of Congo origin may be expected on the market. They also show very clearly the progress made in the cultivation of the *canephora* species. The same is affirmed to be the case in Madagascar, where the *canephora* variety is preferred to the *liberica* on account of its early and abundant crops, of which the commercial value exceeds by 8*s*. or 12*s*. per *cwt*. that of the *liberica* coffee from the same district.

Nevertheless, the cultivation and exploitation of the coffee plant in Africa have made but little progress in comparison with the extension of the cultivation of coffee from the centre of Africa, which has taken place in in India and the Far East. It should, however, be added that coffee is increasingly grown in some of the German colonies in Africa.

The area under coffee in 1909 was estimated at 1976 acres in Usambara, and the amount of coffee which could be obtained in Massai was reckoned at 2.2 lbs. per tree, 400 trees being planted per acre.

DISEASES AND ENEMIES.—Dr. H. Morstatt, of the Amani Botanical Station has published a long list of the fungoid and insect pests which attack the coffee plants of this colony.

Hemileia is now found in all the tropical regions of the globe and though *C. robusta* is more resistant than the other species it seems not to be completely immune from this parasite. In 1903-04, Mr. Laurent brought back from the Congo numerous specimens of the *canephora* and *robusta* groups of which the branches and leaves were attacked by this parasite. Other diseases of *C. robusta* have been recorded.

Stem Canker due probably to a fungus, *Asospora Caffeae*, seems to have been able to develop because the plantations were at first very thick, but its extension has been hindered by planting the shrubs further apart and by burning all infected individuals.

Cercospora caffeicola and *Xyleborus*, the Boebock of the Indians, do more damage on the *robusta* than on the *Java* and *liberica* groups; but *Corticium javanicum*, the Djamoer-oepas of the Indians (produced by *Lecanium viride*), and eel-worms seldom or never attack *robusta*

All these considerations show how important it is not to send seeds from Africa to new plantations without having taken all the precautions necessary to the interests of the planters.

COMMERCIAL VALUE OF THE PRODUCT.—It is objected that the berries of the *robusta* group and of other African coffee are small in size and inferior in flavour; but the continually increasing quantities of this coffee sold in Holland and the satisfactory prices they fetch show that the public is beginning to appreciate them. No objections will be made to the size of the berries when by means of careful cultivation and especially of right preparation, a coffee is obtained equal in flavour to the (old) Java and Arabian coffees.

(Monthly Bulletin of Agricultural Intelligence and of Plant Diseases)

April 1913.

CORRESPONDENCE.

The Managing EDITOR,
The Planters' Chronicle,
Bangalore.

Dear Sir.—I must congratulate you on the increase of correspondence on practical points in connection with the Planting Industry, and hope now that a start has been made, it will lead to further letters from individual planters.

If this is kept up, we are likely to get a lot of valuable information, and the interest in the *Chronicle* will be greatly enhanced.

Last week, we had quite a good letter from Mr. Barnard and he touches on one or two interesting points.

He starts with the existing state of combination in the planting community but I am more inclined to agree with "South India" that combination amongst us is *non est* and it is time the Planters of Southern India awakened to the fact.

His next point is 'the almost complete absence of practical suggestions, results and records of experiments and general treatment of the really important matters in planting, to which I can only say 'hear, hear.'

We have the services of an eminent Scientist who is willing to do all he can for us—comes round our Districts and recommends certain experiments in manuring which we all gaily agree to carry out with the result, that at the end of the period, some one has gone home or statistics have not been carefully kept and the results are *nil.*

His next point also quite agrees with "South India's" argument that we are all too much taken up with our own individual interests to bother about combination.

The second part of his letter in which he says undue prominence is given to the Labour Question, I cannot quite agree with.

I am quite with him that conditions vary in different Districts, but the time is coming when we will have to get over these differences and agree on some combined plan of campaign.

His second paragraph in this part of his letter bears out my own opinion and that of "South India" that there is no uniformity amongst planters of South India and it is high time they recognised it for themselves.

I now come to his first point in the third part of his letter. and my reply to this is, that if planters would air their views on practical planting in the *Chronicle* a little more freely than they do, this difficulty would be overcome.

A travelling assistant would mean a man who knew Coffee, Tea, Rubber and Cardamoms who would require a big salary besides travelling expenses which we cannot afford.

His concluding suggestion I am quite in sympathy with, and I think the U. P. A. S, I. is the medium for improving our labour conditions, but here again our rock of destruction is want of combination.

In conclusion I must say Mr. Barnard has brought forward some sound points which might be considered at the coming meeting of the U. P. A. S. I. with great advantage to the Planting Industry of Southern India.

Yours faithfully,
"WANDERER,"

Tea Drier.

The Managing EDITOR,
The Planters' Chronicle,
Bangalore.

Dear Sir,—Can you or any of your readers inform me whether a tea drier heated by electricity has yet been invented or is at work anywhere? I should be grateful for any information.

Yours faithfully,
WATU.

The Labour Problem.

THE EDITOR,
The Planters' Chronicle.

Sir,—The Chairman's letter to the Secretary, U. P. A. S. I. reproduced in your issue of the 9th instant, again shows the almost entire hoplessness of any agreement among S. Indian planters. Mr. Barnard in the same issue touches the chief reasons for this.

What strikes me most is the absolute futility of attempting to prevent emigration by any means except approximating conditions in S. India to those obtaining in other planting countries.

With the pay and other inducements held out to emigrate, can we expect that coolies will remain contented with the more moderate emoluments to be had on S. Indian Estates? Crimping letters and swindling maistries are *mere excrescences*—the real trouble for us is that there is a better market for the cooly's labour than our own. Indians are conservative to a point—and so, many still continue to go to estates they know, or are still unwilling to go too far from home; but the unchanging East is daily changing before our eyes, and returning emigrants are continually advertizing the advantages of emigration.

Mr. Abbott says that "Government may have to undertake an enquiry as to whether the drain of emigration can go on indefinitely, as Railways, Public Works, and the Forest Department are all suffering from a shortage of labour"—but what can Government do, save pay the market rates, and induce labour to stay in India? Is the liberty of the subject to be curtailed in order that certain Departments may be cheaply worked? As my interests are all in that branch of planting which I have often been assured "being the least remunerative will be the first to go the wall," I deeply regret the situation—but cannot see any hope of salvation in Government legislation or the Registration of Maistries. Ceylon seems to have had enough of legislation, which only worries and does not produce—and Travancore planters have just asked their Government to stop legislating. The Registration of Maistries is quite a respectable idea, and would probably have some effect in occasionally embarrassing a swindler; but will it affect the *root* of the evil? Will it stop the ordinary maistry from paying up his advances, and going elsewhere?

At last in Mysore we are feeling the pinch of emigration and competition and our coolies are going to "Malabar." So far, only a few rogues have left me, owing money to my maistries; but I hear from several others that honest men have *paid up their balances* and gone to Eldorado. How is Government or any one else to stop this, save by approximating the earnings of our labour to those of our rivals? Or are we to ask Government to make it difficult or impossible for our labour to go to "Malabar"? And what would "Malabar" think of this? At the last meeting of the U. P. A. S. I. which I attended, I was told that if emigration could be stopped, we should have plenty of coolies. Quite so—but how to stop it? only by S. India offering inducements similar or superior to those of Malaya etc. Behind Mr. Martyn's up-to-date advertising must lie something solid to be advertised. Crimping will always go on—though if laws allow, and the Police develop morally, an occasional crimper will be punished, or a defaulter detected under Registration rules.

What, I ask, has ever been proposed to meet the real trouble, which is the superior attraction held out to labour over seas? I hear that in Malaya the Tamil cooly lives like a lord, goes to bazaar with his wtfe in a rickshaw pulled by Chinese, and imports Dramatic Companies for his delectation.

I honestly believe that the solution of the question will have to be by natural laws, and not by legislation. Things will have to level themselves. As the Chairman very sensibly writes, there will have to be a limit to expenditure in Malaya and elsewhere. The drop in rubber prices will work for us as well as against us—overtapping and other circumstances will help. On our part, I suppose we must help the solution by raising rates to suit the dearer times, so far as we are financially justified in doing so. Mysore must get on level terms with "Malabar," and S. India generally with its rivals. The result of this will no doubt be the elimination of the less productive properties. The survival of the fittest *is* a natural law. There is no doubt in my mind that in the days to come the poorer Estates must go, both here and overseas. Legislation can only deal with the excrescences—the dishonesties common to all walks of life—and we should not expect much from it. Government may refuse *indentured* coolies to other land, but it cannot do anything to stop emigration; and we cannot expect every cooly going abroad to be treated like a Siberian exile.

Yours faithfully,
(Signed) C. DANVERS.

Freights.

THE EDITOR,
The Planters' Chronicle,
Bangalore.

Dear Sir,—In reply to "Curer's" letter in your issue of the 16th, I regret to see he thinks my query was in the light of a "Bomb." Your Editorial remarks have misled him. I was merely asking for some straight forward information, on a subject of general interest to us.

The rebate was on Freight.

The Account reads: "To Rebate paid by Bombay Steam Navigation Co., on Cwts.——— @ 2/ shillings per 14 cwts.... etc.

The Coffee was shipped from the West Coast.

In your issue of August 2nd "Curer" states that "The question of Freight Rebates was more or less laid to rest in 1894, I think chiefly because one if not more of the agitators realised the equity of the Curers position in regard to these freight returns."

Others besides Mr. Graham, to whom "Curer" offers explanations, must have been at school at this remote date. Will not "Curer" give the "Younger Generation" some enlightenment?

If other Steamship Lines pay these rebates, are we not entitled to some explanation as to why our "Agents" (?) pocket them?

Yours faithfully,
SLEEPING BROTHER.

PEPPER.

The Annual Report of the Taliparamba Agricultural Station contains an interesting account of various manurial experiments with Pepper. Though there was a poor crop during the year under report, and the majority of the experimental plots gave a yield below that obtained in 1911-12, the plot which is treated with Lime and Leaf mould showed an increase over the last year's crop. The plot manured with fish is doing well, the plot treated with ashes responded in the first year or two of application but has steadily deteriorated within the last few years. A comparative test between Gingelly Oil-cake and cattle manure shows that the cake is not so lasting as the latter and the vines on the plot receiving cake do not recover after years of heavy bearing. The plots receiving Leaf mould and Leaf mulch are both doing well. On the latter a mulch of fresh leaves is spread over the ground at the end of the season and this is allowed to rot during the next monsoon when it is dug in. The vines stand the hot weather much better than on most plots owing to the complete ground protection.

Experiments with different methods of cultivation show that mounding has only a temporary beneficial effect. The only green manure which appears to be any good for Pepper is ground nuts. These are sown at the beginning of the monsoon and the plants dug in before the rains cease. An interesting experiment is being conducted with Pepper grown on posts connected by cross poles to a trellis about eight feet high on which the vines are trained. They are heavily manured every year by digging a trench alongside the line of trellis and manuring heavily with a mixture of Lime, Leaf mould, and Fish manure after which the trench is filled in. The trench is dug one year on one side of the trellis and the next on the other side. The manuring was begun when the vines were three years old and has now been carried on for the last three seasons.

The results obtained at Taliparamba are very interesting but there appear to be no control plots with which the results of the use of different manures can be compared. This detracts considerably from their value from a planter's point of view as does also the fact the rate of application of the various manures is not stated. For anyone wishing to repeat the work at Taliparamba on an estate on a large scale there is little information in the Report to enable him to do so.

Ceylon.

RUBBER EXPORTS.

The following statistics of the exports of rubber of domestic production from Ceylon during the month of April and the four months ended April, 1912 and 1913, have been extracted from official returns issued by the Ceylon Government.

To	April 1912. *Lbs.*	April 1913. *Lbs.*	Jan.-April 1912. *Lbs.*	Jan.-April 1913. *Lbs.*
United Kingdom ...	404,495	646.445	2,345,148	3,726,888
United States ...	261,084	356,290	1,396,629	2,509,802
Other countries ...	67,970	387,962	636,581	1,399,526
Total exports of rubber of domestic production..	733,549	1,390,697	4,378,358	7,636,216

The Board of Trade Journal.

The Planters' Chronicle.

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THE U. P. A. S. I.

(INCORPORATED)

Twentieth Annual Meeting.

The Twentieth Annual Meeting opened at Bangalore on 25th August, 1913, the following being present :—

CHAIRMAN	MR. C. E. ABBOTT.
VICE-CHAIRMEN	MR. E. A. HUGHES. MR. E. L. MAHON.
PLANTING MEMBER	THE HON'BLE MR. E. F. BARBER.
SCIENTIFIC OFFICER	MR. R. D. ANSTEAD, B. A.
SCIENTIFIC ASST. FOR MYSORE ...	MR. G. N. FRATTINI.
SCIENTIFIC ASST. FOR COORG ...	MR. L. G. JONAS.
SECRETARY	MR. FLETCHER NORTON.

Delegates.

Anamlais	MR. G. L. DUNCAN. MR. C. R. T. CONGREVE.
Bababudin	MR. R. D. LOVETT. MR. S. H. DENNIS.
Central Travancore ...	MR. R. P. ROISSIER. MR. J. S. WILKIE.
Coorg	MR. E. L. MAHON. MR. F. MACRAE.
Kanan Devan	MR. E. A. HUGHES.
Mundakayam	MR. ASHTON HAMOND. MR. EDWIN VINCENT.
Nilgiris	MR. J. S. NICOLLS. MR. A. S. DANDISON.
North Mysore	MR. T. HUNT.
Shevaroys	MR. GUY TURNER.
South Mysore	MR. W. L. CRAWFORD. MR. M. J. WOODBRIDGE. MR. C. LAKE.
South Travancore ...	MR. J. H. PARKINSON.
West Coast	MR. H. WADDINGTON. MR. CAMPBELL HUNT.
Wynaad	MR. W. E. BOWNASS.

Visitors.

Sir Hugh Daly, K. C. S. I.
Mr. Chadwick.
Mr. Lund.
Mr. Scoble Nicholson.
Dr. Coleman
Mr. Noel Kirwan.
Dr. Watson
Mr. Bainbrigge Fletcher, R. N.
Mr. Warburton.
Mr. Cox.
Mr. Berrie.
Mr. Bell.
Mr. Playford.
Mr. J. A. Richardson.
Mr. Harley.
Mr. Cantley.
Mr Campbell.
Mr. Burnett (Parry & Co.)
Mr. Fulcher.
Mr. B. D. Darkin.
Mr. W. E. Forbes.
Mr. Birnie.
Mr. Plowden.
Dr. Sudborough
Mrs. Anstead.
Miss Sladden.
Mrs. Lund.
Mrs. Playford.
Mrs. Mahon.
Miss Adam.
Mrs. Cantley.
Mrs. C. Lake.
Mrs. Abbott.
Mrs. Nicolls.
Mrs. Richardson.
Mrs. Plowden.
Mrs. Hamond.
Miss Palmer.
Mrs. Dandison.

AGENDA PAPER.

MONDAY, 25th AUGUST.

1. Secretary's Annual Report
2. Chairman's Address
3. Work of the Planting Member
4 Scientific Officer's Report
5. Weights and measures
6. Roads and Communications—
  (a) Arsikere—Mangalore Railway
  (b) Theni Bridge
  (c) Vaighay Valley Railway
  (d) Athur Ghaut and Feeder Roads
7. European Defence Association
8. London School of Tropical Medicine

TUESDAY, 26th AUGUST.

9. *Labour*—
  (a) Report of Sub-Committee
  (b) Recruiting and Emigration
  (c) Enticement of advanced labour to emigrate
  (d) Non service of Warrants
  (e) Maistry and Registration Scheme

WEDNESDAY, 27th AUGUST.

10 *Agricultural Matters*—
  (a) Pests and Diseases and Pest Act
  (b) Fertilizers
  (c) Products
11. *Rubber*—
  (a) The International Exhibition 1914
  (b) Ceará Rubber
12. *Legislation*—
  (a) Prevention of thefts of Rubber, Pepper and Cardamoms

13. *Coffee*—
    - (a) Hybridization
    - (b) Markets
    - (c) Adulteration

THURSDAY, 28th AUGUST.

14. Planters' Benevolent Fund
15. *Planters' Chronicle*
16. *Duties*—
    - (a) Proposed coffee cess and popularization
    - (b) Export duty on Bones, &c.
    - (c) Import duties on insecticides, tea, coffee and rubber machinery
17. *Tea*—
    - (a) Markets
    - (b) Cess
    - (c) Green Tea
    - (d) Railway Freight on Tea Seed
18. *Finance*—
19. Scientific Department
    - (a) Retention of services of Scientific Officer.
    - (b) Proposed office of Mycologist
    - (c) Assistants
    - (d) Bulletins
    - (e) Scientific Officer's Programme 1913-1914
20. Rules of the U. P. A. S. I.
21. Election of Office-Bearers

The Annual Report of the Secretary, 1912-13.

There has been no addition to the list of District Planters' Associations affiliated to the U. P. A. S. I. but the Malabar Coast Planters' Association has changed its name to West Coast Planters' Association.

The Hon'ble Mr. J. G. Hamilton, having resigned his appointment as Planting Member on the Legislative Council of Fort St. George, an election was held which resulted in the selection of Mr. E. F. Barber to represent the Planting Community.

Mr. John C. Sanderson, the Association's representative on the London Chamber of Commerce, after many years work for the Association, resigned, and the thanks of this Association were conveyed to him. Mr. G. Owen, was asked to take his place, which he has kindly consented to do.

Invitations to the Annual Meeting have been issued to the gentlemen interested in the various planting industries, many of which have been accepted.

A small Exhibition has been started in the office which will, I hope, form the nucleus of a permanent Exhibition of the products grown in Southern India. It is hoped by this means not only to preserve a permanent record of the progress made in your various Districts, but bring them into closer touch with one another. The success of this Exhibition depends on the continuous support given to it by yourselves. I trust, that interest will not be wanting.

I very much regret to have to report that an attack of Green Bug has occurred in Mysore and Coorg during the past year, but the prompt manner in which the attack was met by the Planting Expert and Mr. Frattini, Scientific Assistant (Mysore), and the advice given by them, checked not only all tendency towards panic but the pest itself. Though checked, it has not been exterminated, and it will depend upon yourselves by being ready with the necessary appliances in the shape of sprayers and insecticides to keep it down and prevent its spreading. Much valuable advice and information as to its treatment will be found in the pages of the *Chronicle.*

The one point of importance during the past year has been the Labour Question, which has exercised the minds of the Labour Committee appointed at the last Annual Meeting to consider the feasibility of a scheme that would be approved of by the various District Associations, but so divergent have been the opinions expressed, that is has been found quite impossible to produce a scheme that would be acceptable to all. It therefore remains for you, gentlemen, to effect a compromise amongst yourselves at this meeting, to solve this question. Delay will only increase your difficulties. Grasp your nettle, here and now; and let compromise amongst yourselves be the basis of your discussion. A Bulletin, which I trust has been of some use to you, has been issued from the office focussing in a condensed form the troubles that other countries are going through over this same question. It is impossible to minimise the importance of this question, which is the most important that will arise at this meeting.

An International Rubber Exhibition is to be held in 1914 and your support is solicited, and you will have to decide if South India Rubber is to be represented. I need not dilate on the value of advertising, and those who followed the descriptions of the New York Exhibition will have learned many lessons from it.

Arsikere-Mangalore Railway.—A great deal of information has been collected and forwarded to the Planting Member who urged the importance of this line on Government, and you will be glad to hear, that the prospects of constructing it in the near future are more hopeful than they have been.

Mr. L. G. Jonas, the Scientific Assistant for Coorg, arrived last November and has taken up his work.

The work of the Scientific Department has very largely developed during the past year. Its utility and necessity is daily being more appreciated by the Planting Community, as evidenced by the ever increasing requests for advice and the numerous samples received for investigation.

Only Rs.54-6-0 has been spent on the Nilgiri Experimental Hybridisation Plot this year, leaving a balance of Rs 210-10-0.

The Planters' Benevolent Fund has now a total investment in Government Securities of Rs.15,500 held by the Mercantile Bank of India, Ltd. in safe custody and the balance in the Bank is Rs.1,005-10-7. A short report has been issued up to December 31st, 1912, and a book containing a full report and subscriptions in detail from 1909 is ready for issue. Only two applications since the starting of the fund have been received and Rs.500 has been allotted. Your continued support and subscriptions to this very deserving fund is earnestly solicited.

The Kalisyndicate are undertaking manurial experiments in Mysore and Coorg. Rs.3,000 has been received and Rs.1.603-11-2 has been spent leaving a balance of Rs.1,396-4-10 at credit.

The Offices have been insured for Rs.7,000 and the lease of the offices has been renewed for 5 years at the same rent as hitherto.

You will be glad to hear that in accordance with your instructions of last year, all correspondence have been filed and a methodical system introduced into the office which greatly facilitates the business of reference, and that the records have been catalogued.

The Government of India has appointed a small committee to go into the question of weights and measures, and their report will be awaited with much interest.

The Indian Tea Cess has been renewed for a further period of five years.

The Office published in the course of the year Bulletin No. 2 on the Labour question and Book of Proceedings. The sale of the latter was satisfactory. At the last Annual Meeting a loss of Rs.150 was estimated. The actual was only Rs.26-2-6. If all members would take the book, no such loss need occur.

In regard to the *Planters' Chronicle*, which became the property of the Association from August 1912, the accounts are satisfactory and show a profit of Rs.2,510. The popularity and usefulness of this paper, have been mainly due to the valuable papers of the Planting Expert, who has not spared himself in writing and publishing articles both attractive and interesting to the Planting community. Lately, the paper has become more freely used by correspondents, using the columns of the paper as a medium for asking for, giving, and receiving information. I trust, that it will still be more largely used in the future, and that the interest newly awakened will not lapse.

The accounts for the year have been laid on the table. They show a larger increase both in expenditure and in income than hitherto. A comparison of actuals with estimates shows the following totals:—

	Estimate.	Actual.
Income	... Rs.15,904 11 7	Rs.19,016 9 0
Expenditure	... Rs.13,569 7 0	Rs.14,775 10 0

It must be noted, however, that the income comprises Rs.1,595 subscription for 1911-12 besides a sum of Rs.872-6-4 a fifth dividend from Messrs. Arbuthnot & Co's. insolvent estate. The above two items cannot be reckoned as a part of the ordinary receipts for the year 1912-13. On the expenditure side Rs.918-5-5 shown as a bad debt is the amount lent from the Reserve Fund in 1911-12 for the Laboratory Upkeep. This sum was to have been repaid as subscriptions were received for the Laboratory Upkeep Fund but as the funds of the Association are now amalgamated, the debt has been taken over by the Association and discharged. Also Rs.725 6-0 has been charged as depreciation at 25%, but the Finance Committee have resolved that no depreciation shall be written off for a year, after which it shall be fixed at 10%.

In conclusion I beg to tender my resignation as your Secretary.

The Chairman's Opening Address.

GENTLEMEN,—You have heard the Secretary's Report read. The accounts are in your hands, and I hope that you will consider that they are quite satisfactory, and show that our finances are again upon a sound basis. During the year the Finance Committee have received accounts every month from the Secretary, in a form which enabled us to see how things were going. These appear to have been rendered without putting any undue strain upon the staff.

South Indian Planters' Benevolent Fund.—This continues to make progress, though it is not as well supported as it ought to be.

A full report has been prepared by the Secretary.

There have only been two applications for help during the year, in both of which the Committee has given assistance.

I would like you all to impress upon the Members of the Associations you represent the advisability of subscribing. Mr. Richardson and those who assisted him to start the Fund are working Planters who understand what is wanted, what might be wanted by anyone, be he a Planter, a Government Official, or any European living in India.

We have all known cases where a man has been told by his Doctor that he ought to go home for a time, or send his wife or child home ! and has had to borrow money at heavy interest, or perhaps had to disregard the advice. Or a man may find himself out of a billet at very short notice, and there are other hard cases where a subscriber can look to the Fund for assistance without feeling that he is in any way asking for charity.

Those of you who have read the Report of the Ceylon Benevolent Fund will see what a good work it is doing. That Fund has been in existence for many years and has been liberally supported by Proprietors and Firms interested in plainting. We cannot hope to rival it for a long time and pay regular pensions to relatives left badly off.

But there are instances where a temporary allowance or a loan or a grant of a few hundred rupees would smooth over a rough bit of road. And to that extent our Fuud can help.

I would just add that in the two cases in which help has been given, the beneficiaries had not been subscribers. But now that the Fund has been in existence for 5 years such cases should be very rarely entertained.

The Chronicle has done well and the financial result is very creditable to the Editor and Manager, who was not only new to the work, but had to clear off advertising contracts which had been paid for several months in advance, and from which we got no benefit. I am glad he has been able to add something to his income as well as ours. There is no reason why the profit should not be greater in future.

Mr. Anstead has been a regular contributor and has continued to make the paper a mine of information on all Scientific subjects connected with planting. His Assistant Mr. Frattini has also to be congratulated on making a very promising beginning.

The increase in outside correspondence which has been so noticeable lately in the paper is a very favourable sign of the interest that is being taken in it.

Railways and Roads.—I will not say much about the Arsikeri-Mangalore Railway, the matter has been in the able hands of our Planting Member. I went to Ootacamund in May and with Mr. Barber and Mr. Bell, the Consulting Engineer for Railway Construction with the Mysore Government, had an interview with His Excellency Lord Pentland. The Madras Government and the Local Authorities in South Canara are anxious to have the part of the line in British territory constructed. His Highness the Maharaja of Mysore and his Advisers are willing to build their part. So we think that there is at last a prospect of this much needed railway coming into existence.

Five years ago, when I was Chairman, I remarked that we knew there were Officers high up in Railway affairs who were in favour of this line, and that though they had been temporarily silenced by those above them, when they came to be heads of the Department, their views would prevail. Let us hope that that time has come. The only other remark I need make in this connection concerns the amount of mystery that has surrounded the terms of the contract which the Secretary of State made with the South Indian Railway. The Company was perfectly right to secure the best terms it could get. But the Government of India owns 14/15ths of the shares presumably in the interest of the country, so it is odd it should have sanctioned a contract it appears ashamed to publish, and which has enabled the Company to hold up any Railway construction that did not suit its book for several years past.

The Delegates concerned will no doubt give us information as to what has been done about the Ahtoor Ghaut Road and the Theni Bridge. The latter piece of work has been before this Association certainly ever since I first attended these Meetings 8 years ago, and the delay in its completion is a blot on the administration.

Scientific Department.—Mr. Anstead has had to do a great deal of travelling in addition to his work at Head Quarters, and has also had to deal with a serious outbreak of Green Bug. He will read you his own Report. But in spite of all his occupations he has, as always, been ready to go outside his own work to help me when I have asked him to: and I have to heartily thank him.

All the Districts have expressed their anxiety to retain his services, and I hope we shall do so.

Products.—Our principal products have had their ups and downs, but on the whole we have done fairly well.

The lower price of Rubber which has recently prevailed is according to the best authorities only temporary and can be remedied by more careful standardisation.

It is also proposed to establish a factory for the manufacture of every article required by users from cultivated rubber.

The recent fall in the price of coffee appears attributable more to political causes arising from a dispute between Brazil and the United States than to anything else. Coffee Planters have long ago learned to regard with reasonable suspicion the estimates of Brazil crops circulated at this time of year.

We have had to contend with an outbreak of Green Bug in Mysore and Coorg, which was probably introduced from the low country and favored by the long drought during the first half of the year. This was promptly taken in hand under the supervision of our Scientific Officer and his Assistant, aided by the Mysore Agricultural Department, and we have to thank Dr. Coleman and his Assistants for all they have done to help us. I hope that the Monsoon has removed the last traces of this pest. The attempt to get the British Customs Duty on tea reduced failed, and it is a question if a reduction would do us much good, or if it would allow the market to be flooded by a quantity of cheap China tea. The remarkable feature of the debate in the House of Commons was Mr. Lloyd George's attack on tea drinking, which he declared had been responsible for the increase of tuberculosis throughout the country. The statement may have benefitted his supporters who own the "The Cocoa Press" and improved the value of any Brewery Shares in which the Party Funds are invested. But it must have come as a shock to many of his followers who have been brought up in the belief that tea drinking is not only a sure road to health, but a means of Grace.

However the statement has done us no harm for the British Public has responded with alacrity to the discovery of a new vice, the demand for tea has largely increased, and the market is higher than it was before the Chancellor of the Exchequer spoke. We have to thank the Madras papers for regularly publishing telegrams giving us the latest London quotation for tea and rubber.

Labour.—Our labour troubles continue, and it is a poor consolation to us to learn from the very interesting Bulletins compiled by our Secretary that the trouble is universal throughout the East.

We had instances given us at our last Meeting of the malpractices of the Ceylon Recruiters who had been inducing coolies on some Shevaroy Estates to desert. It was finally explained that this was nearly another of the cases with which we are so familiar, of a high principled gentleman from Ceylon being led astray by his wicked Indian subordinate. The "Ceylon Times" considered that the Recruiter was a real smart man, and that the Shevaroy Planters were merely advertising their incapacity to take care of themselves by complaining. The Ceylon Commissioner whom we are glad to welcome here, has taken a different view of these matters, and has shown his anxiety to promote fair play. Ceylon is close at hand, and the Colombo papers are always ready for a fight, but if it were not for the competition of the Straits for coolies, Indian and Ceylon Planters would have little cause to quarrel. Tea is still the staple product in Ceylon, and neither there nor in India can Planters afford to go on piling up advances and raising the rates of pay indefinitely. The Straits Planter with the assistance of his Government is able to land his coolies on the Estate free of debt, to pay them better wages than those received by a farm labourer in Europe, and to give them various privileges which the farm labourer does not enjoy. This seems to defy competition, but we are not going to give in without struggle. There are signs that the Straits Planter is not altogether happy, and that the Shareholder is wishing for retrenchment.

Mr. Aylmer Martin placed his great experience at our disposal, to prove to the Indian cooly that he is at least as well off in his own country as he would be if he emigrated. He has followed that line himself, and though he is recruiting in Districts where he is in direct competition with the Straits he is successful in getting all the coolies he wants, at reasonable rates of pay.

The attempts that have been made to induce Government to discourage emigration have so far met with no success. though most Indian landowners would like to see it checked, and though all the great Departments that employ labour, are finding their workmen's bills constantly increasing.

Will Government do anything? I very much doubt it. Government has never interfered with emigration except where there was clear evidence of ill-treatment.

What we can reasonably ask is that coolies shall not be encouraged to emigrate, and discouraged from coming to work for us: that Railways which really belong to Government shall not grant special facilities for coolies going abroad, which are denied to us: that it shall not be in the power of Colombo papers to say that the Madras Government has ordered its Officials to assist Ceylon Recruiters in every possible way.

The way in which Government assists Overseas recruiters while throwing obstacles in the way of recruiters for Indian Districts is one I have alluded to before both here and in Council. I see that the same complaint is being made up North. For in a recent issue of "Capital" speaking of the tendency of the Indian to emigrate to countries where he is not wanted and the shortness of labour in Planting Districts that paper remarks: 'Let them read the report of Dr. Banks, Protector of Emigrants, Calcutta, for 1912, and they will see how Government officials deliberately encourage coolie emigration to the West Indies, etc., whereas they put every obstacle in the way of coolies going to Assam.

We ought to endeavour to eliminate inter-District competition among ourselves. If it were possible to come to some agreement about rates of pay it would be a great step. But we must all recognise the difficulties in the way when conditions vary so much as they do with us.

Last year you appointed a Committee to consider the proposal to have all coolies registered, to collect the opinions of the District Associations. to harmonise them if necessary and to circulate a working scheme before this Meeting with the idea of improving the labour situation. The Committee's Report will be read to you. It was found impossible to harmonise the views of the different Associations. They varied from unqualified approval to unqualified repudiation. Thus two cooly registration schemes which have cost their authors a great deal of time, and been fully considered by all concerned have fallen to the ground. But although the principal object for which the Committee was appointed has failed the year has not been wasted. A great deal of information has been collected. and the Committee has prepared a report making certain suggestions which you can discuss. There are also two proposals independently prepared by Mr. Nicolls and Mr. Waddington for the Registration of Maistries. These have I believe the support of the Nilgiri and the West Coast Associations, and others have expressed their approval of the idea. Anything that makes for inter-District working ought to be welcomed, and I hope good will result from the discussion. As I have said before in another connection what we want in these cases is criticism. Even destructive criticism, which may cause annoyance to men who have taken a great deal of trouble in working out these schemes, is better than a polite acquiescence. which leads after months of more hard work to the discovery that the bulk of the Community will have nothing to do with them, and only wants to be left alone.

To many of us the labour question appears nearly all important. In some Districts things may be said to be approaching a crisis. Rates of pay have been raised, and still coolies are short. Maistries on whom we have depended for years have either failed us, or have come in with less than half their gangs. We must, either as an Association or as individuals find a remedy.

There is always a temptation to ask for Government assistance, or even for legislation : I am convinced that this is a matter in which we had better help ourselves and that Government interference would be only in the direction of placing restrictions on any hold we have over our labour now. We may leave Ceylon out of the argument. Planters are a power in that Island, and no Indian nor Straits Planter expects to hear of a Magistrate giving an unindebted cooly 3 months rigorous imprisonment for not coming regularly to work, as is done in Ceylon. But a friend of mine who was planting for some years in the Straits has been good enough to write fully in reply to certain questions I asked him. He admits that Government does assist Planters in recruiting, but it exacts very onerous conditions in return. He writes " we have not to pay a cooly when he is not working. but against this we must, if a cooly is ill, send him to Hospital where he is medically treated and fed at the Estate's expense. Every Estate is compelled to have either a Hospital of its own or to join with neighbouring Estates and have a Central Hospital. A European Doctor must visit the Hospital at least twice a week and run the Hospital. All this is borne by the Estate."

" Under this heading I should like to point out that the health of each and every Estate is of the greatest concern to the Government. Estates are visited, periodically by the P. M. O. the State Surgeon, the District Surgeon, the Controller of labour and his Assistants. One is never free of them. They inspect the cooly lines and inspect your books and make themselves generally objectionable. Should the death rate on an Estate exceed 7% for a half year, a tribe of the above Officials comes down on one. The first thing they do is to stop your recruiting new coolies from India. More than probably you are ordered to feed all coolies at Estate expense, to have your own Hospital, and to drain your swamps. As a nett result you are lucky if you escape the " Sack" from your employers."

Again he writes:— " One thing more, remember that the largest employer of Indian labour in the F. M. S. is the Government itself. It is going to recruit all the Indian labour it can for its own use. It can afford to carry out every whim we can suggest about better treatment of Indians, and what is more make Estates do the same". These are not the views of an unsuccessful man, but of one who did very well there.

The great advantages the Straits have over us is that when the cooly has gone there he has to stay. He is landed free of debt, he is at liberty to leave on a month's notice and has only to save a comparatively few dollars to return home. So are other exiles in other countries: but they don't, and the cooly does not. In our Districts things are very different. A cooly has only to take his weeks expense money on a Saturday, and be home in his village before we have missed him, and in that way alone we or our Maistries lose tens of thousands of rupees every year. What we want is an Agency in our Recruiting Districts that will know where to look for such coolies, an Agency which will be responsible that money sent to Maistries is spent on advancing coolies, not on buying cattle and land, and that when coolies are advanced will see they start for the Estate they have contracted to work on.

As I have said, one of our Districts has had a Labour Agency working successfully for years. We ought to discuss the possibility of establishing such an Agency under the U. P. A. S. I. I believe that we ought to move in that direction. It may not be possible to establish a single Agency: but we ought to all act together.

The great majority of us are going on year after year losing money: some of us afraid to advance largely under existing conditions, some advancing recklessly, nearly all of us short of coolies. It is full time that this condition of things was altered.

We have a great deal of business to get through and I will not detain you any longer from it, except to thank all the Councillors for the willing help they have given to the Executive during the year, and to my colleagues the Planting Member and the Vice Chairmen for their counsel and assistance. Mr. Anstead, I have thanked already. Our Secretary was new to the work but he took it in hand with energy, and has justified your selection.

The Planting Member's Address

Mr. Chairman and Gentlemen,

As this is the first meeting since my election, I would express my hearty thanks to you for the honour you have done me. I can only say, as I said last year, that I hope my ability to forward your interests may be equal to my opportunity.

Labour.—Since last January, I think, never a week hardly even a day has passed but I have heard something on the question of labour, and I believe that our difficulty in procuring labour increases quicker than our need for it. You will remember that I have had no instructions from you as to what line I should take on this question, in fact the Association has not formulated any policy. I hope that this will be remedied, and that at this Meeting some suggestion will be made and adopted which will show our determination to tackle this problem seriously. I must say at once, that the more I hear of the matter the more convinced I have become that we must work out our own salvation. It is all very well to talk of the restriction of recruiting, and I think it is good thing to do. We live in the midst of labour and complain that we cannot get labour, that our competitors across the water get the better of us and thereby show our weakness to the world. Surely if we are aware of this weakness we can pull ourselves together, and organize. I am hopeful that we can do so, and I feel certain that, with a good will, some trouble, and expense, we can hold our labour for our own needs against anyone. I think it is doubtful if emigration could be restricted by legislation, but I do not think it is at all doubtful that things will have to become much worse with us and cultivators of this Presidency in general, before the Government of Madras considered legislation of this nature with a light heart.

I do think that Government could and should help us in the matter of labour. They should see, both in the case of controlled and uncontrolled emigration, that our competitors have no advantage that we have not got, and they should be swift to check any abuses in recruiting, whether for emigration or for work in this country. There are abuses, this is generally admitted, and some few cases have been brought to light. I would ask you gentlemen with the help of your Associations to bring to notice any abuses you may know of. Hearsay alone is no good, we want good, hard, well proven facts.

It has been said that, if the present system of recruiting has the abuses that are alleged, it would fall to pieces of itself. I do not think that this is necessarily so Look at the sums paid for a recruited cooly, consider the class of man that is likely to be attracted by these fees and then consider the class that is recruited. The recruiter has some education and the wage he gets must make him to some extent unscrupulous, while the cooly is, as a rule, illiterate and a child in his hands. It will be understood that I am speaking of professional recruiting and where high prices are paid, even up to Rs.150 a head, I am told, for so much human flesh and blood it would be unnatural if there were no abuses. Another thing that may keep a rotten system going is that it is playing into the hands of kanganies and maistries. It is not difficult for them to see the advantages of selling the services of themselves and their coolies to the highest bidder, or even, in the case of dishonest men, of selling their services to two parties. Surely some proofs can be forthcoming that this is done, not only by maistries, but by coolies also.

It may interest you gentlemen to know what the drain by emigration is. By the favour of the Chief Secretary I have been given the emigration figures and I find that during the decade ending 1912, 3,477.676 people have emigrated to Ceylon, Burmah and the Straits. and that 2,725,670, emigrants have returned. This gives an average loss to these 3 countries of about 75,000 per annum, but, as you all know emigration has increased considerably of late, in 1903 the loss was 21,395 in 1908, 85,703, and in 1912, 90,217.

The population of the Madras Presidency is about 42 millions and the average increase of population is roughly speaking 300,000 a year. You will see then, that the loss has averaged 20% of the increase in the whole population for the past 10 years, what the percentage on the increase of population of those classes which are recruited for work on estates may be, I have not been able to find out; something enormous.

I would make these suggestions for your consideration :—

1. The abolition of the professional recruiter.
2. The establishment of a Labour Commission.
3. The consideration of the question of advances or premium paid to secure a coolie's services,

I do not think that these of themselves, if given effect to would check this drain to the extent that we would wish, but they might tend to check it or at anyrate help us towards making work in this country more attractive to the labourer than work abroad.

Cinchona.—During the year the question of Cinchona planting has come up and it is an open secret, if indeed it is a secret at all, that a proposal has been made that Government should plant Cinchona on the Anaimallais.

It has been our consistent policy to oppose any planting by Government and I can see no reason now why we should change that policy. I think I am right in saying that my predecessors who have taken up the matter at all have all urged Government to encourage planters to plant cinchona. I think that the men who urged this have been justified by events and have proved themselves more farseeing than Government. The position, now that the combine is through, is not yet quite clear, but it seems certain that if Government wishes to buy bark in Amsterdam now, they will have to pay the Dutchman's minimum, a minimum they have always refused to their own planters. It also seems certain that those of us who still have chinchona will have no market to sell in.

Under these circumstances it is satisfactory to know that Government have stocks that will, as far as can be seen, outlast the term of the present combine and it is also satisfactory that I have an assurance that Government will purchase what bark we can supply up to 300,000 lbs. of 4% bark per annum, but I do not know what price will be fixed. -

I have been asked, and shall be glad if I can be told at this meeting, what bark can be supplied by planters for the next 5 years.

I do not think it can be denied that an assured supply of quinine at a reasonable price is of importance to the country.

The fact that Government feels bound to purchase bark as cheaply as possible for the benefit of the people has been the bar to their fixing a minimum price for our unit. It is obvious that if they do start planting for themselves. on a larger scale, they will fix a minium unit and that minimum will be their cost of production. It should be easy for us to prove that we can produce cheaper than they can, and I would suggest a minimum unit and Government control of any further acreage to be planted. They can estimate their requirements 10 and 15 years ahead and it would be absurd to expect them' to agree to pay a minimum unit price for more bark than they require,

Scientific Department.—I have been asked to find out the wishes of the various Associations not only regarding the continuation of the Department but also for the retention of present Scientific Officer's services. If we are desirous of keeping the appointment on, I understand the matter has to be referred to the Secretary of State, and the Government of Madras, in order that they may help us, would like us to make our case for a permanent department as strong as possible.

I am of opinion, if we keep the Department on, that we should ask to have it put on a broader basis. It is hard to expect one man to work unaided over so large an area and to give us all the results we want. Mr. Anstead tells us that a mycologist is really a necessity to deal with our worst diseases, and I would suggest that we ask not only for a mycologist but also that the salary and prospects of the existing office be made such that will not only attract but keep a first class man.

We do not want a billet like this to be looked upon as a stepping stone to other things, and we do want continuity. The value of our exports from the Presidency alone amount to some 240 lakhs, so the Government contribution of Rs.5,500 cannot be deemed adequate, and it hardly affects the total of the amount estimated in the budget for agriculture.

Arsekere-Mangalore Railway.—This is more or less a local matter, but it is one that has been before this Association for many years. The South Mysore Planters' Association brought up the question again early in April, and since then I have sent through the Secretary to the Associations concerned all the information I could gather. The position is satisfactory, but there will still be some further delay before a start is made. It is now more than 12 years since the last report and estimates were made, and now a new estimate and a new traffic estimate are considered necessary. The scheme has the approval of the Mardras Government, and I understand that it has been sent to the Railway Board for sanction. I also understand that there will be no difficulty in finding the money as soon as sanction has been given. Our thanks are due to the South Canara District Board for the prompt manner in which they imposed a Railway Cess. It was done within a fortnight from the date on which the suggestion was made to the President, Mr. Couchman.

The Engineer-in-Chief for Railway construction with the Mysore Government has been kind in placing information at our disposal.

European Defence Association.—This is hardly a part of the Planting Member's work, but had it not been for a visit to Madras to attend a Council Meeting, I should not have come into touch with the Association, nor have attended the meeting which inaugurated the Madras Branch. The Association started as long ago as 1884; I am told its inception was in Madras. That and the cause for which it was started that it achieved its immediate object and lapsed into comparative obscurity. That it is being revived and supported throughout India is perhaps a sign of the times. It is the only European political organization in India, at a time when other political organizations are active, for this reason it is worthy of support and if you require other credentials I must refer you to its literature and to the names of those gentlemen who are on its council in Calcutta, and control its work.

Annual Report of the Scientific Officer.

1ST JULY, 1912 TO 30TH JUNE, 1913.

Mr. Chairman and Gentlemen,

I have the honour to present to you my Fourth Annual Report as Planting Expert and Scientific Officer to the U. P. A. S. I. This Report takes the usual form being a summary of the work done by the Scientific Department during the year under review; detailed discussions of pests, diseases, manures, &c., are left to be dealt with under their separate headings on the Agenda Paper of the Annual Meeting. At the special request of the Chairman, however, an Appendix has been added showing in tabular form the annual increase of the work of the Department.

OFFICE AND CORRESPONDENCE.

My Office staff throughout the year has consisted of one writer and one peon, and the upkeep of this staff was met as in former years by a contribution from the Government of Madras.

During the year the Library has been arranged and catalogued. The U. P. A. S. I. have accumulated many valuable records in the form of Government Publications, Agricultural Bulletins, Scientific Periodicals &c., but formerly these were in such a state of confusion that it was difficult to refer to them. Though much remains to be done to make the Library a useful working one, publications can now be found with little trouble and in a reasonably short time. A Card Index of Agricultural Subjects has been begun and it is hoped some day to make this complete, as it is felt that it would be a valuable asset in an office which is becoming more and more a Bureau of general agricultural information, and being widely used by planters as such.

Office work annually increases, as is only natural when it is remembered that the Department has only taken four years to grow from nothing to its present dimensions, which though no doubt modest, takes up a considerable amount of time in organisation and correspondence. We now have an Office which is a Bureau of information; a weekly official organ, the *Planters' Chronicle*; a chemical Laboratory; and two Assistants with head quarters in the districts of Mysore and Coorg respectively, with rapidly growing local Departments. all being controlled from Bangalore. Under these circumstance it is not surprising to find that the correspondence which has passed through my hands during the past year has increased by 20 per cent. 797 letters have been received and 818 written during the twelve months under review and these have all received my personal attention. While I consider this is a valuable,. and under the existing conditions, a necessary part of the work of the Scientific Department, it should be noted that it absorbs a great deal of time which might be devoted to scientific work. and renders anything in the nature of research work practically impossible.

PUBLICATIONS.

I have contributed regularly to the pages of the *Planters' Chronicle* which continues to be issued as a weekly publication, and I have written 15 papers for it as well as many notes and miscellaneous items. A special section dealing with the work of the Scientific Department and agricultural matters of general interest has been maintained weekly throughout the year.

At the last Annual Meeting a resolution was passed asking the Department to endeavour to publish Bulletins, but it has been found impossible to do so, partly for want of time, and largely for want of material of sufficient importance to warrant a special publication like a Bulletin. Until the scientific staff is increased, and more experimental work in the field is done, the publication of Bulletins in addition to the *Chronicle* appears to be out of the question.

HERBARIUM AND COLLECTIONS.

Little work has been done on these during the year for want of time, but a few sheets of interest have been added to the Herbarium and a few insects have been collected and sent to the Government Entomologist at Coimbatore.

There is a proposal to establish a museum of products, pests and diseases, &c., of interest to the planters of Southern India, and while I feel sure that this is a step in the right direction and I shall be glad to give all the help in my power, I feel that it is impossible for me to undertake any more work than is being done at present. Volunteers to do museum work are needed and will be heartily welcomed.

TOURS.

During February and March of this year I made a somewhat lengthy tour in the Pulneys and High Range, both new districts to me and visited for the first time. I have also visited the following places and districts during the year under review for short periods for special reasons:—Madras, Chickmaglur, Coorg (twice), South Mysore, Coimbatore, and Nilgiri Experiment Plot.

These tours have necessitated my being absent from head quarters for 74 days during the year and travelling a distance of 2914 miles by rail and 1143 miles by road. Again during the period under review I have toured less than during the first two years I joined the Department, and so have been able to devote more time to laboratory work, and this is I think as it should be. I have now visited all the districts under the U. P. A. S. I. and am familiar with their varying conditions, and little more can be done than has already been done by visiting estates.

SCIENTIFIC ASSISTANTS.

Mr G. N. Frattini, the Scientific Assistant for Mysore, has completed his first year's work in the country. His headquarters have been established at Goorghully in South Mysore and he has completed an extended tour of the whole district to make himself familiar with the conditions. His presence has quickly made itself felt as he has been able to begin a number of manurial experiments with Coffee under the Kalisyndicate scheme, to carry out experiments to investigate the influence that Bees and other insects may have on the fertilisation of Coffee and its quality in co-operation with the Government Entomologist, and to begin the study of Black Rot and other coffee diseases. That his value is fully realised by the Mysore Planters' Associations is shown by the fact that they have decided to provide him with a small laboratory, the apparatus for which has arrived in the country. This fact is, I think, quite sufficient to show that an excellent year's work has been done.

Mr Jonas, the Scientific Assistant for Coorg, arrived in Bangalore on 30th October and after spending a few days at headquarters he went to Coorg and began work. His headquarters have been established at Rock Hill, near Sidapur. It is as yet too early in his career to enable me to give any definite report upon his work and value to the Planters.

I understand that Mundakayam is considering the appointment of a Scientific Assistant to study Rubber, and I trust that the appointment will be made at an early date and the Assistant added to the staff of the Scientific Department of the U. P A. S. I.

EXPERIMENTAL WORK.

In 1910-11 an attempt was made to arrange for the carrying out of experiments in each District. Local Committees were appointed and consulted and a number of experiments were decided upon, and a list of these was given in my Annual Report for 1911. Since then, however, practically nothing has been heard of the majority of them, and I believe that few were even started. It appears therefore, that it is not possible to get the planters themselves to carry out experiments, and only when Assistants are appointed will any such work be done.

A few experiments have been carried out during the year, chiefly in Mysore and Coorg, where the Scientific Assistants have been able to supervise them. The most important have been the following:—

(1) *Manurial Experiments with Coffee.*

The offer of the Kalisyndicate of the U. P. A. S. I. was accepted at the last Annual Meeting and in Mysore experiments have been begun. In Coorg plots have been chosen and marked out and manures will be applied after the South West monsoon is over.

Experiments have also been carried out on one estate over a period of three years with a manurial system based on a chemical analysis of the soil and the past history of the estate. The results have been published in the *Chronicle* and the yield of coffee has been doubled during the short period of experiment.

(2) *The Conservation in pits of composts of pulp and lime sweepings, &c.*

In accordance with a resolution passed at the last Annual Meeting this work has been continued on these estates in Mysore and Coorg. The analyses of one compost have already been published in the *Chronicle*, and the other two will be ready at the end of the year.

(3) *The effect of fertilisers on the latex yield of Ceara Rubber.*

Experiments, first on a small scale and then repeated on a somewhat larger area, indicate that the application of ¼ lb. of Nitrate of Soda per tree to Ceara before tapping materially increases the latex yield, while Saltpetre appears to have a still better effect. This work will be continued and other soluble fertilisers experimented with.

(4) *Bees and the Fertilisation of Coffee.*

In co-operation with the Government Entomologist a series of experiments were conducted during the blossom season of this year in Coorg, Mysore, and the Shevaroys, designed to study this important subject. No results will be available until the crop on the trees experimented with is ripe. In connection with this work the Government Entomologist visited the Districts named above.

(5) *Hybridisation of Coffee.*

This work is being continued in Coorg and Mysore on special estates. The Nilgiri Experiment Plot has been planted up with a number of different varieties of coffee and a few hybrids of known history and the plants are growing well. Nothing more can be done until they flower and are old enough to produce seed.

PESTS AND DISEASES.

During the year under review a new pest on Tea appeared in the Nilgiri—Wynaad in the shape of a caterpillar called *Heterusia virescens*. This did a considerable amount of damage locally but was got under control by means of handpicking the caterpillars and cocoons.

The most important event of the year under this heading has been the unfortunate appearance of Green Bug (*Lecanium viride*) on the Coffee in Coorg and South Mysore. It was first noticed during the dry weather of this year and it was promptly dealt with, by drastic pruning and spraying and every effort was made to prevent it becoming established. In this work the presence of Scientific Assistants was invaluable, and it is most fortunate that this pest was kind enough to await their appointment before putting in an appearance. The monsoon and a parasitic fungus have helped to check the scale, but that these alone will not eradicate it has been amply proved in Coorg where the Bug appeared in new places during the monsoon and was found on one estate which had had 80 inches of rain in two months. The matter is therefore most important and serious.

It would appear that the pest must have been introduced from the low country though the exact means by which the introduction was made has not yet been proved. It is under investigation. The outbreak of this post in two new Districts simultaneously has raised the important question of necessity for, and the practicability of, a local Pest Act. Pamphlets in Canarese describing the pest and the remedies, and asking that it may be reported when noticed, have been widely distributed among the ryots and Indian Coffee planters.

I should like in connection with the outbreak to record my thanks to Dr. Coleman, the Director of Agriculture for the Mysore Governmet, for his advice and help and his promise of aid from his Department to check the spread of the pest in Mysore.

The fact that a Fumigatorium has been established at the Lal Bagh Gardens, Bangalore, in which plants are treated before being sent to the Districts is worthy of record, especially in view of the Green Bug, and our thanks are due to Mr. Krumbiegel, the Economic Botanist for the Mysore Government, for so promptly meeting our wishes on this point expressed at the last Annual Meeting and establishing this system of fumigation.

LABORATORY.

A considerable amount of work has been done in the chemical laboratoy during the year, and 40 analyses have been made in addition to special investigations.

Among the investigations completed, or still in progress, the following are the most important :—

(1.) In continuation of the work begun two years ago on the study of the manurial requirements of Coffee, analyses have been made of the developing berry each month throughout a complete cycle of growth. This work will form the subject of a paper to be presented during the Meeting.

(2.) Some Coorg soils were examined for their suitability for the cultivation of Tea.

(3.) A number of samples of Fish manure have been analysed, and it is very noticeable that much of this fertiliser contains high percentages of sand, rendering its value doubtful and adding largely to its cost of transport. One sample examined during the year was found to contain as much as 31·65 per cent. of sand.

(4.) A number of fertiliser guarantees have been checked by the Scientific Assistant for Mysore.

(5.) Samples of adulterated coffee have been examined

(6.) Many analyses of miscellaneous products, such as Tea Fluff. Composts, Green Dressing Plants, poonacs, &c., have been made.

It is hoped that in the future time will be allowed to continue this laboratory work and to undertake fresh investigations which may suggest themselves.

CONCLUSION.

The period of five years for which my services were originally lent to the U. P. A. S. I. will be completed before the Annual Meeting of 1914 so that this seems a suitable occasion to examine the needs of the Scientific Department as it nears the end of its first period.

When I arrived in April 1909 the U. P. A. S. I. had not even an Office of its own. We now have a fine combined office, a catalogued reference library, a scientific publication published weekly instead of monthly, and yielding a fairly handsome profit to the Association, and a chemical laboratory. We have a staff of three, myself at head quarters with a large amount of office and organisation work to do, and two Assistants with head quarters in two Districts, one with a small laboratory in course of construction. All of us are primarily chemists. So much for the establishment. The District it has to work over stretches from North Mysore in the North to Trivandrum in the South, and from Bangalore in the East to the sea board on the West, comprises a matter of over 120,000 acres on which three main crops are grown as well as many minor products. If the Scientific Department has justified its short existence, as I trust it has, now is the time to decide whether it is to be increased in size and efficiency so as to be able to deal with this huge tract of country and these varied agricultural interests, and if it is to take its place by the side of Agricultural Departments in other Colonies.

As most of the important problems with which Planters in Southern India are faced can only be studied and solved by means of carefully designed, and still more carefully carried out, experiments in the field, the future policy of the U. P. A. S. I. should be to strengthen the staff of their Scientific Department. This particularly applies to Rubber and Tea Districts where both chemical and mycological work are badly needed, and where practically nothing is being done to increase our knowledge of cultivation and manufacture on scientific lines. As compared with other Tea and Rubber growing countries, like Ceylon, Malaya, and Java, South India is a long way behind. In the countries mentioned well equipped and well staffed Scientific Departments exist which are rapidly making themselves noted and pushing the agricultural products of their respective countries to the front.

I venture to advise the U. P. A. S. I. to expand their Scientific Department therefore, first by appointing more Assistants, especially to carry out Tea and Rubber investigations on the estates themselves, and secondly to consider the advisability of appointing a Mycologist for the whole of the Districts. The latter is in my opinion badly needed. The majority of the worst diseases of crops from which we suffer are fungoid, I need only mention Black Rot, Stump Rot, Root diseases, Pink Disease, Die Back, while even some of the insect pests like Green Bug might possibly be controlled by means of parasitic fungi in the hands of a skilled Mycologist.

In my humble opinion these are the immediate needs of your Scientific Department, a Department which I am very proud to have had the honour of helping to establish.

RUDOLPH D. ANSTEAD,
Planting Expert.

Appendix.

Showing the Annual increase of Correspondence. Tours, &c., of the U. P. A. S. I.

		1909-10.	1910-11.	1911-12.	1912-13.
1. *Correspondence—*					
Letters received	...	217	536	710	797
Letters written	...	210	534	642	818
2. *Planters' Chronicle—*					
Special articles	...	32	36	35	15
Notes and other articles	...	62	62	50	70
3. *Tours—*					
Days absent from headquarters	...	100	176	76	74
Mileage by Rail	...	4,800	4,438	6,080	2,914
Mileage by Road	...	1,800	2,004	757	1,143
4. *Laboratory—*					
Analyses made	...	—	20	37	40

R. D. A.

The Planters' Chronicle.

RECOGNISED AS THE OFFICIAL ORGAN OF THE U. P. A. S. I., INCORPORATED.

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(INCORPORATED.)

Annual Meeting.

SECOND DAY, AUGUST 26TH, 1913.

The Delegates met at the Mayo Hall, at 11 a.m., and sat till 5-30 p.m. The whole day was spent in discussing the Labour Question, the speeches on which will appear in full in the Book of Proceedings.

THIRD DAY, AUGUST 27TH, 1913.

A joint lecture by Messrs. R. D. Anstead and C. K. Pittock dealing with the composition of the Coffee Berry and the manuring of Coffee estates was delivered. This lecture is published in full in this issue.

The subject of Pests and Diseases provided an interesting discussion upon the outbreak of Green Bug in Mysore and Coorg and the methods of dealing with it. Dr. Coleman, Mr. Bainbrigge Fletcher, and Mr. Chadwick, the Director of Agriculture, took part in this discussion and finally the following resolution was passed :—

" In view of the presence of Green Bug on coffee estates in South India, it appears essential to this Meeting that the Government should introduce some form of internal Pest Act in order to strengthen the hands of their scientific staff, who may be employed for the stamping out of pest and keeping it under control; but would suggest that if any general Pest Act became law, its provision should be submitted to the U. P. Association for consideration and report."

MR. BAINBRIGGE FLETCHER.

Mr. Bainbrigge Fletcher, the Imperial Entomologist, said that when he had visited Mysore and Coorg it was before the outbreak of this scale, and as far as he was able to see there was no scale there at the time. He had, however, since seen the scale on the Shevaroys and Anamalais. On the Shevaroys he believed it had been in existence for the last ten years, but had apparently done little damage. On the Anamalais it was very bad on the northern slope. On the Nilgiris, he had not seen it to any extent, but they all knew, and the planters knew better than he, how much damage it had done there. He believed that in some parts it had gone so far as to wipe out the coffee completely. In Ceylon the scale was introduced about forty or fifty years ago when coffee was the staple industry. It was believed to have been brought in from Brazil. It was one of those pests which had been brought in from outside countries, and those pests did the greatest amount of damage, because they came in by themselves without bringing their parasites and natural enemies with them, and thus were able to live and increase under abnormal conditions. The rate at which these insects were able to multiply was something one could hardly realise. Taking for an example an insect which laid 200 eggs and went through its stages in one month, which was a very average rate of increase and time. If on the 1st January such an insect laid 200 eggs, by the end of the year they would find that from that one insect over two trillions of insects had come into existence. They could not realise what an enormous quantity those figures represented, so he would try and give them an illustration. If 1,000 of these insects occupied a space of a cubic inch, two trillions would cover the whole land surface of the world to a depth of 80 ft. Again, taking 1,000 to the cubic inch, put all together in one mass, two trillions would occupy a space of seven million cubic miles, or a cube which measured 200 miles on each edge. Fortunately, no insect in this world multiplied at this rate, because it had to fight so many enemies in the course of its existence. In the case of an insect brought in new to the country, it escaped to a large extent these enemies. For this reason it was that these introduced pests were so important. Therefore, when a pest like the Green Bug was brought into the country, it found as much food as it required and could and did multiply at an enormous rate without restraint. In the case of the Green Bug there were very few parasites that preyed on it. There was a fungus which attacked it in the wetter time of the year, but they could not rely on fungus to keep this scale wholly in check, as during the dry season the fungus could not spread while the scale went on increasing and extracting moisture from the plants at a time of the year when moisture was most deficient in the soil. For the control of this particular scale it was important and actually essential that outside measures should be taken, such as spraying or brushing, or any other practical measure which might be suited to particular local conditions. There was a good but homely old saying, that there were more ways of killing a cat than choking it with cream, and that is applicable to insect pests. No general rule could be laid down to deal with all pests; they had to take measures which were applicable to particular local conditions. In the present case he would say from what he had seen of the scale and from his experience in other countries, where scale were serious pests, that spraying was probably the best method of controlling this scale. In those districts which the scale had recently invaded, the planters of the estates attacked, and those estates which were not attacked, should take up the question of spraying seriously, and do their best to keep the scale under control before it got bad. That might secure a certain measure of success; otherwise if the scale got in in really large numbers, covering the whole area, it would get out of hand, and it would be a very serious business, indeed. They could not tell whether it would assume the same destructive proportions in Coorg and Mysore. The damage done seemed to depend on conditions which were not yet understood. In the Shevaroys the damage was very slight, although the scale was well distributed throughout the Ditrict. In other districts the damage had been very severe. Whether the damage would be severe or slight in Mysore and Coorg one could not foretell. It would be much better to try and keep the scale in check before it attained proportions in which it does damage than to wait and see whether it was doing damage when they could do nothing to check it.

DR. COLEMAN.

Dr. Coleman said that with regard to the question of prediction of the spread of new insect pests, he would give a short statement of a personal experience in Mysore about four or five years ago. A new grass-hopper pest had been brought into the State from Bombay, which was seriously attacking the cholam and other cereal crops. The pest, the first time he came in contact with it, was very serious, and was scattered, over a wide area, but was not equally distributed, but, was found in isolated patches. For two years he studied the question and then published a bulletin in which he predicted, with some reservation. that the insect might be expected to spread over North Mysore, and might also be expected to extend its depredations to the ragi crop. He might say that his prediction was falsified, because he was unable to predict the weather conditions. The weather conditions in Mysore, for the past few years, had been peculiarly unfavourable to the increase of the insect. One of the essential factors for the spread of the pest is the necessary sap at the time the insect emerged, roughly, in July. Since the last serious attack in Mysore, there had, every year, been a failure of the early rains, and, therefore, a lack of food, with the result that the insects died in large numbers. Since then they had appeared in small numbers, but he had not the slightest doubt that the insect was still there, and when favourable conditions returned, they might expect the insect to spread. He was, therefore, in the same position as Mr. Fletcher was with regard to Green Bug, he did not know what was going to happen. The only safe thing to do was to take precautions to ensure being able to deal with the pest, He did not believe in a policy of " wait and see." They ought to take matters in hand before they got serious.

With regard to Green Bug he had little practical experience of the pest. He had seen it on a couple of estates in Munzerabad. When he saw the insect it was supposed to have gone. The fungus disease which certainly did attack the insect, had probably killed 90 per cent. of the scale. The spraying which had been done thoroughly on certain estates had also a marked effect. Nevertheless, it did not require a very long search to find that the scale was still present. Now with regard to what they were to do. It was perfectly clear they had a Scientific Department, and it was unnecessary for him to give them advice or to give them any assistance. (Cries of " No, no.") They were intelligent gentlemen with a knowledge of the country and the life history of the insect, and knew the means to take to check it, and that should be sufficient. He, on the other hand, had to deal with a large body of people who knew nothing about insect pests, who knew nothing about the control of insect pests, and who had a natural conservatism behind them with an additional incubus of a strong desire to let things rest as they were. The problem he had to tackle was a good deal more difficult than the problem that they had to tackle. On the other hand, he was quite well aware that the success of their portion of the task would depend largely on the portion of the work undertaken by the Mysore Agricultural Department and the support of the Mysore Government. Now, he was sure, speaking from his own standpoint, that they were quite alive to the seriousness of the position, and he was certain that the Mysore Government were alive to the seriousness of the position, and he thought that he could safely say that any reasonable proposal to deal with the pest would be favourably considered by the Government. What could they do to combat the danger? The first thing that he proposed to do, and that within a week's time, was to examine into the question of the source of infection. They knew that a theory had been advanced that the insect came in manure bags from the low country. He was not prepared to make any statement regarding this. Looked at without consideration, it seemed improbable, but very improbable things had happened before now. It was important, however, that they should get to the bottom of this matter. It had to do with areas not yet infected, and if the insect was brought up in manure bags, it was very likely, indeed, that those areas would be infected in some way. In case this proved to be a fact measures could be taken to prevent a recurrence of the infection. He proposed, therefore, to put the best assistants to work on the Railway lines and along the main roads leading to the coffee estates to ascertain the villages from which the cartmen had come, and to search the material the cartmen carried to find if any infection was there at all. At present they knew that a certain number of estates had been infected. They knew of very few estates owned by Indian planters being infected. He had, no doubt, that quite a number of these were infected. What he proposed doing was to have a list of estates in Mysore where Green Bug was present, and he proposed to get a list of native holdings within a radius of three or four miles, and to put men on to search these holdings to see if they were infected. He hoped also to be able to turn into South Mysore something like forty sprayers within the next two or three weeks, and he proposed that all spraying work should be done under the supervision of the Mysore Agricultural Department. He believed in doing the work thoroughly.

One other point was the question of infestation of abandoned estates and the small patches of coffee round the houses of the ryots. That was a very serious question, and he would like to have the opinion of the Meeting as to how it could best be handled. As regards abandoned estates, he thought that it could be possible to remove the old coffee and root it up. He was not quite conversant with the conditions under which abandoned coffee was held. If the Government had resumed the land, it would have been returned to the Forest Department, and they could be dealt with in the way suggested. If they were in the hands of Indian owners, it would be more difficult, and it would be possible to work through the Revenue Department to put pressure on the men to get the coffee plants out.

To carry out the general campaign he proposed to proceed on the same lines as those adopted in the campaign against *koleroga*. He proposed to employ local men to work under the Mysore Agricultural Department for a certain number of months. These men would be chosen for their knowledge of local conditions in the *hobli* or taluq, and it would be their duty to report every week. Their work would be constantly inspected by the superior officers, and he would constantly inspect the work of the superior officer. He hoped that the work would be efficient. The plan had worked well in the case of *koleroga*, and he hoped that they would be able to do something on the same lines with regard to Green Bug. He would be glad of any suggestions from planters for combating the pest on Indian estates.

FOURTH DAY, AUGUST 28TH, 1913.

The Delegates met again at 11 a. m. and sat till past 5 O'clock. The Sub-Committee on Labour read their report which was unanimously adopted.

CEARA RUBBER.

Mr. Mahon made the following remarks on Ceara Rubber, which led to an interesting discussion, in the course of which Mr. Mahon kindly gave much useful and valuable information.

" I have several times been asked the question of ' How is Ceara likely to pay in Coorg ?', so without making any lengthy speech on the matter, I should just like to say a few words with a view of getting more thoroughly into touch with those, who like myself, take an interest in this species of the Rubber industry, and thus endeavour to encourage a higher standard of working for our mutual benefit.

Many of you will have read Mr. Anstead's letter on this product in the *Chronicle*, written after a visit he paid to the Estates in Coorg that I have to do with. Here this gentleman ably describes our different methods of cultivation and tapping, together with his criticisms thereon, which hardly leave me room for further comment. I should however endorse his remarks as to the importance of giving the trees a thorough cultivation from the start. Many men have been content to plant large fields of Ceara, and then leave them more or less to struggle on, as best they can, amidst a jungle of grass and weed. I should say at once cultivate it properly or leave it alone. Much valuable land, money, and time have been wasted in the past in this respect. That Ceara will pay and pay well, if these conditions are carefully carried out, I am convinced of. We in Coorg have been treading our way up to date, carefully and cautiously, more towards finding out the best systems of tapping and curing, than of gaining any large result; also our endeavours have been directed towards discovering, on moderate lines, the best tappers, so that we can propogate from these trees for our benefit in the future and thus materially improve our selection.

Taking one of our Estates as as example of what we did this past season, we tapped approximately 19,260 trees an average of 40 times, which gave us 7,186½ lbs. of dry rubber or a little over ⅜ of a pound per tree, which we placed on the Market at a profit of 10½d. per pound, after covering every expense connected, from the season's cultivation down to the freight to London.

These 19.260 trees would be represented in about 170 acres, composed of approximately 115 tappable trees to the acre, six years old each. Of this I should compute quite another 40% per acre have yet to arrive at the tapping stage. The average yield per tree will go on steadily increasing and also the cost of manufacture will be considerably lessened now, by reason of our having established up-to-date machinery.

I shall further be glad to place anyone desirous of obtaining further information, in direct communication with certain of my Managers."

FIFTH DAY, AUGUST 29TH, 1913.

The Delegates met for the final session at 11 a. m. and sat till 2 p. m. and disposed of the remaining subjects on the agenda paper and the election of Office-bearers for the coming year, which resulted as follows:—

Chairman	Mr. E. L. Mahon.
Vice-Chairman	Mr. E. A. Hughes.
Vice-Chairman	Mr. W. L. Crawford.
Secretary	Mr. Norton.

The Hon'ble Mr. Barber proposed a vote of thanks to Mr. Abbott the retiring Chairman for the able manner in whfch he had conducted the affairs of the Association for the past two years. Mr. Abbott replied and declared the meeting closed.

Memo. of Resolutions.

WEIGHTS AND MEASURES.

1. "That this Association confirms its resolution of last year and again approaches the Government of India in the hope that the standardization of weights and measures may speedily become law."—Carried unanimously.

ARSIKERE-MANGALORE RAILWAY.

2. "That in a view of the material increase in the prosperity of all classes in the State of Mysore, the Province of Coorg and South Canara and

the great and ever increasing development of commerce, and the mineral resources of Mysore, and in view of the elaborate schemes now on foot for the economical development of the Provinces above-named, this Association considers that it is an opportune time to once again bring to the notice of the Government of India the necessity for the early construction of this most important line, forming, as it undobtedly does, the key-stone of any scheme of Railway Construction undertaken for the development of the Province of Mysore and only in a lesser degree Coorg, giving, as it would, direct communication with Mangalore, the natural port of Mysore and the West Coast, and seeing the Mysore Durbar are willing to construct their portion of the proposed line, this Association resolves to ask the Government of Madras to co-operate by urging upon the Government of India the necessity that exists for at once constructing the small and relatively inexpensive section that would have to be built in South Canara joining the Mysore and Coorg lines directly with Mangalore and the West Coast."—Carried.

THE THENI BRIDGE.

3. "That this Association call the attention of the Government of Madras to the continued delay in, and waste of money on, the construction of the Theni Bridge and the continued bad condition of the main road from Periakanal to Bodynayakanur and Kuruvanuth, and that such orders as may be necessary be issued to the Madura Local Board to ensure the speedy completion of the Bridge and getting and maintaining the road in really good order."—Carried unanimously.

YERCAUD FEEDER ROADS.

4, "That this Association do urge on the Government of Madras the necessity for completing the Manjivadi and Kiligur-Pattapadi cart roads and that, as the present Yercaud-Craigmore Feeder Road becomes absolutely impassable after heavy rains, owing to the clayey nature of the soil, this Association begs that Government will have the first five miles metalled." —Carried unanimously.

EUROPEAN DEFENCE ASSOCIATION.

5. "That this Association is strongly in sympathy with the objects of the European Defence Association and trusts that Honorary Secretaries of the affiliated Associations will do their utmost to bring them to the notice of planters and obtain their support." - Carried unanimously.

LONDON SCHOOL OF TROPICAL MEDICINE.

6. "That this Association notes with satisfaction the formation of an Endowment Fund for the purposes of the London School of Tropical Medicine and contributes a donation of £20 thereto and will circularize the affiliated Associations asking their financial support and ask the Government of Madras to approach the Government of India with a view to their contributing towards the £100,000 required."—Carried.

THE LABOUR PROBLEM.

7. "That this Association considering that recruiting has been abused to such an extent as to be detrimental not only to the best interests of the Planting Industry, but also of the Agricultural Labourers themselves, request the Government of Madras may take such steps as may be necessary to suppress the 'Professional Recruiter,' as defined below. 'The Professional Recruiter is an individual who collects coolies and sells them at any centre and afterwards ceases to have any further interest in their well-being, future, or whereabouts, as distinguished from the authorized Kangany or Maistry.'" —Carried,

A LABOUR COMMISSION.

8. "That this Association accepts the recommendation of the Labour Committee to establish a Labour Commission of its own."—Carried unanimously.

9. "That this Association seeing the way in which advances are increasing and the disadvantages they suffer from this competition, not only with foreign countries but also amongst ourselves, urge on District Planters' Associations the desirability of curtailing as far as possible the amount of advances paid."—Carried.

10. "That this Association forwards to the Labour Agent of the Malay States at Madras and the Chairman of the Federated Malay States Planters' Association, copies of the vernacular letter, a translation of which was read at this meeting, with a request that they will deal if possible with the writer of this letter, and deprecates in the strongest possible way such action."—Carried.

NON-SERVICE OF WARRANTS.

11. "That this Association would call the attention of the Government of Madras to the fact that in spite of previous representations made upon this subject, a number of warrants taken out against absconding maistries and coolies, which are unexecuted remains very large and particularly in the Native State of Mysore and District of Coimbatore, and would ask them to urge upon the officials of these respective Districts that greater efforts be made to effect the service of warrants generally and further that we bring to the notice of the Mysore Durbar the fact that the local Courts having jurisdiction are treating non-bailable warrants as bailable warrants, resulting in the escape of the accused."—Carried unanimously.

PEST AND PEST ACT.

12. "That in view of the presence of Green Bug on Coffee estates in S. India, it appears essential to this meeting that Government should introduce some form of internal Pest Act. in order to strengthen the hands of their Scientific Staff who may be employed for stamping out the pest and keeping it under control. But would suggest that before any general Pest Act became law, its provisions should be submitted to the U. P. Association for consideration and report."—Carried unanimously.

FERTILISERS AND GUARANTEES.

13. "That this Association approached the suppliers of fish manure pointing out that in view of the very large percentage of insoluble matter in some of the manure at present supplied by them, they should be asked to guarantee for the future that the members of the U. P. Association be asked to give preference to those firms who are prepared to give such guarantee compatible, of course, with no appreciable increase in cost."—Carried.

REPORT OF LABOUR COMMITTEE.

14. "That this Association unanimously resolve that the Report and recommendations of the Committee be adopted and that Messrs. Barber, Abbott and Nicolls be elected as the Executive Committee to carry out the recommendations made."—Carried.

INTERNATIONAL RUBBER EXHIBITION, 1914.

15. "That the United Planters' Association of Southern India strongly advise District Associations to support the International Rubber Exhibition of 1914 with a view to getting in closer touch with the manufacturer and the standardisation of rubber."—Carried unanimously.

THEFTS OF RUBBER.

16. "That in view of the increase in production of rubber, tea, pepper and cardamoms in S. India. Government be approached and asked to pass an enactment for the protection of these products from theft."—Carried (Resolution of 1910.)

"That is view of the increasing production of rubber in S. India the Planting Member of Council be asked to ascertain if the Government of Madras will bring in similar legislation to that passed in Travancore and contemplated in Cochin."—Carried unanimously.

ADULTERATION.

17. "That the Government be approached through the U. P. A. S. I. with the view to dealers in this country being restrained from selling coffee in tins, with a large percentage of cheap admixtures, under the name of pure coffee, without adding the percentage of adulteration." (Passed at last year's meeting and re-affirmed by the present meeting).

RETENTION OF THE SCIENTIFIC OFFICER.

18. "That the Nilgiri resolution, dated 16th July, 1913, regarding the Scientific Officer be adopted."

"That this Association strongly holds that the appointment of the Scientific Officer still be continued and that Mr. R. D. Anstead should continue to act as Scientific Officer. Were another Scientific Officer appointed, it would mean that it would take such Officer at least 2 years to get into touch with the needs of the various Districts. It is understood that the gross value of the exports of planting products from the Madras Presidency amounts to, 242 lakhs, and in consideration of these figures the Government contribution of Rs.5,500 cannot be considered adequate."

A PROPOSED MYCOLOGIST.

19. "That this Association considers that the services of a Mycologist under the direct control of the U. P. A. S. I. is necessary. That there is a need for such an appointment is apparent from the subjoined list of diseases on which investigation is required, and that the Hon'ble Mr. Barber be asked to urge the matter on Government."—Carried.

IMPORT DUTIES.

20. "That this Association do approach the Government of India with a view to obtaining a remission of duty on all ingredients used as insecticides and germicides, such remission of duty only to be granted to approved firms importing these goods for *bona fide* agricultural purposes."—Carried unanimously.

CINCHONA.

21. "That Government be asked to give a definite declaration whether they intend to plant Cinchona or not, pointing out that this Association adheres to its former policy in opposing the planting of Cinchona by Government, and in view of the necesssity of obtaining a cheap supply of quinine for the country, requests that Government will reconsider the advisability of encouraging planters to cultivate Cinchona, suggesting as a basis a 7/8 minimum and Government control of the acreage to be planted with this product in any one year."—Carried.

RAILWAY FREIGHT ON TEA SEED.

22. "That the United Planters' Association approach the Indian Tea Association asking them to use their influence to obtain concession in the rates of freight on Tea seed, from all railways in India."—Carried unanimously.

EXPORT DUTY ON BONES.

23. "That the Report of the Special Committee appointed to consider the question of the Export Duty on Bones be adopted together with their suggestions."—Carried.

CORRESPONDENCE.

August 27th, 1913.

The EDITOR,
Planters' Chronicle.

The Labour Problem.

Sir,—Every word Mr. Danvers wrote last week was true. Those who want labour now must go on raising pay until they get it, and those who cannot afford to must go to the wall.

Legislation of any sort is futile, especially in Native States because of corruption which is always increasing, and which will do the same in British India as the control of affairs passes into other hands.

Mr. Danvers makes no suggestion as to how we planters may help the situation, and I can only think that extensions ought to be immediately curtailed. The U. P. A. S. I. might strenuously urge all its members to open up no more new land. The tea and rubber community in Ceylon, Malay and S. India have been able to make their conditions so attractive to coolies, that now in the recruiting areas wages are going up almost to the level of that offered in the planting districts, with the result that a further rise will be necessary.

My belief is that in a few years, when the existing acreage in tea and rubber reach the full productive stage, that wages will be double what they are now. Owing to the high price of food stuffs, the cooly is in much greater demand by the ryots, who are themselves extending their cultivation everywhere possible.

Yours faithfully,
(Signed) KITHOGUE.

Srivilliputtur,
27th August, 1913.

THE EDITOR,
The Planters' Chronicle.

Sir,—For some years I have been trying to say the very things that Mr. Danvers has said in his letter published in your issue of the 21st August—not having his gift of expression, my efforts have been scoffed at. as mere attempts to be funny; at any rate they appear to have made little impression beyond my own district, and perhaps in some others in Travancore, unless I can count Mr. Danvers as a convert? There are of course many others with whom I have seen eye to eye all along. Once upon a time Mr. Danvers did not like legislation, because he was afraid of it; now, he sees its futility; he also sees that Registration schemes *(et hoc genus omne)* deal only with mere excrescences. I do hope that the general body of planters will be convinced by his cogent statements and able advocacy. When planters as a body understand the bedrock position, there will be a chance of Unity. The shadow has hitherto been mistaken for the substance, by all those who look to Government legislation, finger prints, and schemes of registration as steps in the right direction—to my mind backward steps.

Yours faithfully,
(Signed) AYLMER FF. MARTIN,

The Editor,
The Planters' Chronicle,

Freights.

Dear Sir,—" Sleeping Brother " has been candid in his letter published in your issue of the 23rd instant.

The steamship Company named will I believe grant the rebate (which is apparently quoted as a precedent for a Planter's claim on the Coalition) to any individual shipper be he a " Firm " or " Constituent " and is doubtless merely a roundabout method of reducing rates of freight with a view to competing with the other Coasting Lines on the West Coast.

The direct Steamer Lines rates are usually, if not always, lower than the through rates *via* Bombay by the B. I. S. N. Co's Line, and for this the Coast firms might reasonably expect some consideration from constituents.

The Rebates paid—and which are legally and morally earned by the Coast Firms who are Members of the Coalition—are merely a small return for the trouble and risks, involved in arranging and providing for a regular and sufficient supply of direct tonnage for produce for shipment to London.

If the " younger generation" are groping about in the dark, and feel that the subject is one which demands more " up-to-date " scrutiny and enquiry, the U. P. A. S. I. might perhaps with advantage ask " Curers" for a repetition of their arguments and to state their case for the benefit of those who feel the "older generation," amongst whom were many men of sound commercial intelligence, have knuckled under to a gross and flagrant injustice

Finally I would mention, Mr. Graham has been favoured with some details on this antiquated subject, and this gentleman will doubtless give " Sleeping Brother" the benefit of some enlightenment on the position—as regards the Freight Rebates—of

(Signed) A. Curer.

Adderley Estate,
Coonoor P. O., 27th August, 1913.

The Editor,
Planters' Chronicle.

Green Bug.

Dear Sir,—It appears that the cost of spraying on this estate which I quoted as Rs.20-4-2 calls for some explanation.

I am willing to give full particulars of the cost of spraying the field I referred to. To begin with Mr. Brown's supposition that the material cost Rs.5-8 per 1,000 is incorrect. The actual cost was Rs.13-7-10 or 70 tins of mixture at 3 annas 1 pie each. I employ one man and a boy to each sprayer for the reason mentioned in my last letter, these cost 6 annas 6 pies per 60 trees or Rs.6-12-4 per 1,000 trees, total cost per 1,000 Rs.20-4-2. I myself sprayed some trees last week with a heavy crop on them, as the task seemed short. It took me about 10 minutes to do one tree, going over every branch and getting the mixture well into the bunches of crop. They were large trees. The fields I referred to are planted 8' x 8' and have a good spread of foliage. I would like to mention that I used new " FOUR OAKS" sprayers for the above field. The total cost per acre for the whole Estate in season 1912 and 1913 was Rs.6-0-4. If the cost be calculated on an acreage basis, the figures I quoted in my letter of 16th July may be halved. Those fields contain about 500 trees per acre and the ground is well covered.

Yours faithfully,
(Signed) L. A, Gerrard Rogers,

COFFEE.

THE VARYING COMPOSITION OF THE COFFEE BERRY AT DIFFERENT STAGES OF ITS GROWTH AND ITS RELATION TO THE MANURING OF COFFEE ESTATES.

By Rudolph D. Anstead, B. A., Planting Expert
and
C. K. Pittock. Esq.

PART I,

During the past three years we have been studying the manurial problem, as it affects Coffee, from a chemical standpoint with the object of trying to obtain some hint, not only as to the best proportions of plant food to give to this crop, but also at what time of year the plant food is best applied.

The first step was to investigate the composition of the Mulch obtained from the shade trees and the coffee itself and to determine its manurial value. This piece of work was carried out in 1912 and reported in detail in the *Planters' Chronicle* (Vol, VII, p. 238). We came to the conclusion that it was quite possible the Coffee where a heavy mulch was established was receiving an unbalanced ratio of plant food, the Nitrogen being in excess, and that the composition of the mulch should be taken into consideration when applying fertilisers. That conclusion is now being worked out by one of us in the field by means of experimental plots of known history.

The next step was to investigate the composition of the Pulp and to ascertain whether this waste product was of any practical value as a fertiliser, and, if so, how it could best be conserved as a compost with other estate refuse. The results of this work were reported at this Meeting last year and the investigation is being continued both in the laboratory and in the field with experimental plots.

The ground being thus cleared we next turned our attention to the actual chemical composition of the Coffee berry itself. When a chemical analysis of parchment coffee, or coffee berries. is critically examined one fact at once strikes one as being prominent. The following analyses are, (a) of the ripe fruit by Hughes ; (b) of cured Mysore coffee by Lehmann ; (c) of the ash of coffee beans by Wolff.

TABLE 1.

ANALYSES OF COFFEE.

	a	*b*	c
Moisture	47·09	7·97	...
Organic Matter	50·37	84·67	...
(Nitrogen)	0·876	2·285	...
Potash	1·11	2·025	62·47
Lime	0·18	0·16	6·29
Phosphoric Acid	0·17	0·37	13·29
Silica	0·08	...	0·54
Soda	0·05	0·095	1·64
Magnesia	0·12	0·36	9·67
Oxide of Iron	0·06	0·055	0·65

In these analyses it will be noticed that Potash is a dominant factor in the mineral constituents of the coffee bean. This is prominently brought out in the ash analysis (c) where there is more Potash than anything else. This being so it is only logical to suppose that a fertiliser containing a preponderance of Potash should help the coffee tree to ripen up and hold its crop, and the question at once suggests itself, when should this Potash be supplied; do the coffee berries need it from the very beginning of their existence as berries, that is as soon as they have set and the blossom has fallen, or do they need it only towards the end of their development? The same question applies also to the Nitrogen and Phosphoric Acid. It seemed to us that if an answer could be found to these questions it would have a profound practical bearing upon coffee manuring.

In order to attempt to find an answer we conceived the idea of analysing the berries each month throughout their period of development from the time they were quite small to the time when they were ripe, and ready to pick. From July 1912 to January 1913 samples were carefully gathered by one of us and these were at once analysed in the laboratory at Bangalore. The results of these analyses are shown in the following tables:—

TABLE II.

ANALYSES OF FRESH COFFEE BERRIES FROM JULY TO JANUARY.

		July.	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.
Moisture ...		87·13	84·45	80·75	71·54	66·06	65·77	66·62
*Organic Matter		11·96	14·67	18·16	26·93	32·05	32·48	31·58
Ash	Silica ...	0·04	0·01	0·03	0.02	0·02	0·04	0·05
	Phosphoric Acid...	0·08	0·07	0·09	0·16	0·15	0·12	0·12
	Potash ...	0·37	0·43	0·49	0·77	0·93	0·88	0·96
	Lime ...	0·04	0·02	0·02	0·02	0·04	0·02	0·02
	Other Mineral Matter ...	0·38	0·35	0·44	0·56	0·75	0·69	0·65
		100·00	100·00	100·00	100·00	100·00	100·00	100·00
*Containing Nitragen ...		0·30	0·38	0·24	0·50	0·61	0·67	0·66

TABLE III.

ANALYSES OF THE ASH OF COFFEE BERRIES FROM JULY TO JANUARY.

	July.	Aug.	Sept.	Oct.	Nov,	Dec.	Jan.
Silica	4·48	1·48	2·84	1·23	1·11	2·47	3·03
Phosphoric Acid	8·48	8·04	8·20	8·40	7·87	6·56	6·86
Potash	40·31	48·38	45·78	50·30	49·40	50·10	53·19
Lime	4·27	2·04	1·89	1·17	1·89	1·23	1·14
Other Mineral Matter ...	42·46	40·06	41·29	38·90	39·73	39·64	35·81
	100·00	100·00	100·00	100·00	100·00	100·00	100·00

The first table shows the actual composition of the fresh berries as regards the constituents named, while the second table shows the composition of the ash, that is the mineral part, in each sample, it being chiefly this mineral matter with which we are at present concerned. In July the berries were very small and it required 72 of them to weigh one ounce. In January the berries were ripe and the last column in each table is the analysis of the ripe cherries as picked for pulping.

In considering these analyses several factors may be discussed. The first is the moisture content of the berries. It will be noticed that this steadily decreases as the berries increase in size and age, until it reaches a minimum as they near ripeness. Evidently then this is an important factor in the well being of the crop. It is a factor which is influenced not only by the rainfall, but also by cultivation; the physical condition of the soil; the shade, its amount and nature; and by the amount of mulch. Undoubtedly every year a certain amount of crop falls off and this is to a certain extent natural, but there are cases when the trees fail to hold their crop late in the season, and it is possible that the moisture factor has some bearing upon this.

The relation of the physical condition of the soil to its moisture content was discussed by one of us in a paper in the *Planters' Chronicle* (Vol, VII, p. 619.) in connection with a peculiar condition of the coffee on some estates in which the berries and young shoots dry up, and a light post-monsoon dig was recommended for certain types of soils The present investigation suggests a possible fruitful side line of research which we would commend to the Scientific Assistants. namely the study of the physical condition of different types of coffee soils and their moisture content at different times of the year in relation to the ability of the coffee grown on them to hold a big crop.

With regard to the mineral constituents of the berries there appears to be a markedly steady increase of Potash content throughout the period of growth, and from this we conclude that Potash in an available form is needed all the time.

The Phosphoric Acid content appears to be a constant quantity at first with a maximum about October, after which it declines. Hence it seems likely that this constituent is needed in an available form chiefly in the beginning of the season.

The Nitrogen content increases steadily throughout the period of growth and keeps pace with the increase in organic matter.

The work is admittedly incomplete, and this paper is only in the nature of a progress report, since we know nothing of the composition of the tree itself from month to month throughout a growing period and the amount of plant food needed to develop its wood and leaves and blossom.

It is fully recognised hat any conclusions drawn from this work must be largely theoretical, but the figures laid before you are facts. Any recommendations made by us based on the results of this work will be tested in the field by actual experiments with coffee of known history and only when the results of these field experiments are obtained shall we be able to come to you with any definite advice. Field work of this kind however takes a considerable time, and we thought that in the meanwhile you might be interested to know what we were doing and how much progress had been made.

So much for the figures, and here my part of this paper as a chemist may well conclude. I shall now leave it to my colaborator to interpret these results as a practical planter and point out to you where they have a practical bearing on the manuring of coffee, if they have one at all.

PART II.

In table III before you, you have the results of the monthly analyses of coffee berries made by my collaborateur and expressed, as is usual, in percentages of the various constituents. In my part of this paper the same results will be laid before you but in a different form, one which I hope will appeal to you as practical men.

I intend speaking of pounds and acres instead of decimals and percentages. An acre of coffee, bearing at the rate of 5 cwt. an acre may be taken to exemplify my figures.

The berries on the acre, (bearing at the rate of 5 cwt., or in other words carrying a crop that after drying and curing will yield 5 cwt. of marketable coffee beans), when ripe, weigh roughly 3,000 lbs. and number about 960,000. I arrive at the first figure from the generally accepted ratio of 200, sixty pound bushels or 150. eighty pound boxes equal one ton of dry marketable coffee, and the second figure by calculation from the actual number of ripe berries which weighed one ounce.

It is interesting to trace the history of this weight of berries and see what may be learnt of the migration of plant food from the plant into the berry and what light is thrown on the problem of manuring coffee.

In June when the berries were so small as to be picked with difficulty, the blossom being a late one, the total weight of the berries on the acre taken for illustration was only 155 lbs.

In July the weight increased to 833 lbs. In August it had further increased to 2,143 lbs. In September no increase was apparent as the number of berries to the ounce was the same as in August. In October the weight of berries had reached 2.500 lbs. and attained its maximum in November *i.e.*, 4,285 lbs. and then begins to decrease as ripening progresses till we reach the weight of 3,000 lbs. for all ripe berries in December—January. All these weights have been calculated from the actual number of berries which went to the ounce in the respective months.

The only figure I ask provisional assent to is 3,000 lbs. of ripe, equals 5 cwt. clean dry. By applying the results of my collaborateur's analyses to these monthly weights we can readily calculate the amount of plant food locked up in the berries at different periods of their growth. This has been done and Table IV is the result.

TABLE IV.

Showing amount of plant food in the berries on an acre of Coffee, (bearing at the rate of 5 cwt. an acre) in the months July to January in pounds.

—	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.
Phosphoric Acic ...	0'66	1'50	1'92	4'00	6'42	3'60	3'60
Potash	3'08	9'21	10'50	19'25	39'85	26'40	28'80
Nitrogen	2'49	8'14	5'14	12'5	26'13	20'10	19'80

The figures shown in the table have been got by calculation from my collaborateur's monthly analyses and the monthly weights submitted above.

From table IV it will be seen that the Phosphoric Acid increases from only 0·66 of a pound total in July to a maximum of 6·42 lbs. on the acre of which we are speaking, in November.

The Potash also reaches a maximum in November but it is present in considerable quantity early in the period of growth *e. g.* in August the berries contained 9·21 lbs. of pure potash.

This remark applies also to Nitrogen, *e.g.* in November 26·13 lbs. were present, in August 8·14 lbs.

Having learnt this much of the migration of plant food into the berry the next question is what bearing this knowledge has on manuring of coffee. Can an average estate soil meet the calls which are made by the crop for plant food without the help of manure ?

We are of the opinion from our experience of the beneficial results attending the judicious use of fertilisers that the answer to this question is in the negative. It should be noted that only the call made by the berries is spoken of in this paper as we are not in a position to guage the demand which the coffee tree itself makes for plant food to mature its wood and leaves and make its normal growth. We may reasonably infer though, that the total demand is very considerably more than that of the berries alone,

If a soil is unable to supply the necessary amounts of plant food—dying back of wood, falling off of crop, general shuckness and unhealthy appearance are only what we might reasonably expect. We are not concerned in this paper with different forms of fertilisers, except in as much as the plant food contained in them is readily available or not.

It would appear from table IV that the call for the three kinds of plant food under discussion *i. e.*, Phosphoric Acid, Potash, and Nitrogen comes about August-September and is kept up till after November.

This being so it would seem prudent to make sure that they are ready in the soil when wanted.

What is the proper season to apply fertilizers to coffee to enable the trees to meet the calls which we see from table IV are made by the berry ? Nitrogen, Potash, and Phosphoric Acid may be considered separately.

Nitrogen.—Nitrates are liable to be washed out of the soil so it would seem that Nitrogen should be put in in 2 doses, one before and one after monsoon. Here we touch the work which has been done on mulch and reported in *Planters' Chronicle*, Vol. VII. 15 & 16. It was there pointed out that the natural mulch supplied considerable quantities of Nitrogen. In view of this supply from the natural mulch and of the probability of considerable amount of nitrates being formed in the hot weather and bearing in mind that normal coffee does not show want of Nitrogen in May—June we are of the opinion that there is a possibility of the before-monsoon application of Nitrogen proving unnecessary. The after-monsoon application of Nitrogen should supply that ingredient in an available form to enable the plant to meet the demand for Nitrogen which comes in August and following months.

Potash.—Salts of Potash are not liable to leaching out so may well be applied before monsoon, though if found more convenient might usefully be put on half before and half after monsoon.

Phosphoric Acid.—It very much depends on whether the Phosphoric Acid is in an avaible form or not when it should be applied. A Phosphatic fertiliser with its Phosphoric Acid in an unavailable form applied after monsoon say September—October could not reasonably be expected to supply much of that plant food to the crop then on the trees.

The table shows that the demand of the berries for Phosphoric Acid is not large early in the season, so an after-monsoon application of Phosphoric Acid in an available form might suffice but it would appear safe to apply the Phosphoric Acid in 2 doses, half before monsoon and half after.

Summing up: *Potash* may be applied before monsoon, or half before and half after.

Phosphoric Acid: should be applied half before and half after monsoon; the after monsoon dose to be in an available form,

Nitrogen after monsoon in available form.

Or in other words two applications a year.

One before monsoon of:—

Half the Phosphoric Acid and either half, or all, the Potash and one after the monsoon of:—

Half the the Phosphoric Acid, half the Potash (or no Potash if it has all been applied before monsoon) and the Nitrogen.

In cases where labour or financial considerations preclude two applications a year a compromise might be effected by applying all the Potash, all the Phosphoric Acid in an available, and the Nitrogen also in an available form as soon after the heavy rains as possible. This method, however, we consider far from satisfactory.

These suggestions are based on our present incomplete knowledge of coffee and cannot be taken as final. As my colleague has told you it is proposed to experiment in the field with coffee of known bearing capacity before any definite recommendations are made. It seemed, however, desirable that you should be put in possession of the inferences we draw from the results of the analyses made and the provisional suggestions based on these inferences, particularly so, as these suggestions do not involve any drastic changes in existing methods of manuring. One investigation leads on to another and this again points to the desirability of a third and so on—for instance the work on natural mulch lead to that on Composts and that again to the investigation at present under report. These pieces of work should not be regarded as separate or disjointed, but as links in a chain. Science has aptly been defined as an ordered systematic pursuit of knowledge, and a scientific knowledge of coffee can only be attained by continuous and systematic work.

It should be noted that this investigation at present under report could not have been undertaken without a laboratory and I hope that in this piece of work another justification for the existence of the U. P. A. laboratory may be found by those who consider such justification necessary. Before closing my part of this paper I wish to say that during the work on the composition of the coffee berry the desirability of an analytical investigation of the coffee tree itself, root, stem, branches, and twigs has several times forced itself on our notice and is in our opinion a piece of work which should be taken up at no distant date.

The Planters' Chronicle.

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THE U. P. A. S. I.

(INCORPORATED.)

Contents.

We would call attention to the heading of this page, where for the future the Secretary's registered telegraphic address will be found. Subscribers, when telegraphing to the Secretary, are requested to employ it.

A short account of the U. P. A. S. I. Exhibition is published, and our thanks are due to all those who helped to make it attractive and also to those who have allowed us to retain samples, to form the nucleus of a permanent record.

Mr. Bainbrigge Fletcher, Government Entomologist, has written an interesting note on *Antestia cruciata*, or Coffee Berry Bug. Through his kindness we are able to reproduce an illustration of the Bug, which will lead to easy identification.

A correspondent sends us an article on the Metric System, which displays considerable ingenuity. There is no doubt that the time must come when England and India must fall into line with almost every other country and introduce a decimal coinage metric system, if they intend to retain the place of pride in the world of commerce. We would welcome more articles of this description from our subscribers.

At our late Exhibition, samples of Rubber cured by means of Sodium Bisulphite were exhibited, and while these samples are still fresh in the memory of those who visited the Exhibition, we reproduce an article on its use in the preparation of Plantation Rubber.

Mr. Danvers asks for more enlightenment on the subject of Green Bug, and we hope that some Shevaroy Planter will give him the information he asks for and to the planting public at large.

In accordance with instructions from the Executive Committee of the Labour Commission, the Secretary has despatched two copies of the Labour Report to every member of every District Association and wishes it to be known that, on application to him, spare copies will be furnished to any applicant.

The publication of Book of Proceedings for 1913 is being pushed on as rapidly as possible, and the Secretary hopes to reduce the cost of it, and hopes that *every* member will take a copy.

The U. P. A. S. I. Exhibition.

As usual an Exhibition of products, fertilisers, machinery, &c., was held in the Offices of the Association during the Annual Meeting, and an interesting collection was got together.

RUBBER.

A number of estates sent in samples of Rubber and as last year the almost white crepe and the sponge-like masses of worm rubber from the Cochin Rubber Co., were very pretty. Eldorado, Pullangode and Rani Travancore also sent samples of different grades of rubber. Among the small samples the diamond crepe from Kerala was undoubtedly the best and caused much interest and admiration.

The Travancore Rubber Co., exhibited samples of all grades on a larger scale in a neat cabinet while from Pudukad came two full cases of Crepe Nos. 1 and 4 showing the rubber as actually shipped home. This is the kind of exhibit that is wanted and is of much more interest to planters than small samples of fancy grades.

TEA.

A number of samples were sent in but nearly all came from one district, Peermade. One Nilgiri sample was shown from Frith Hall and Mr. Nicolls sent a complete set of grades in neat exhibition boxes.

COFFEE.

The only coffee exhibited was an interesting series of Hybrid Coffees from Mr. J. G. Hamilton. In former years Mr. Hamilton has exhibited series of leaves showing the progress made during hybridisation and this year his samples of coffee from the different generations was of great interest. All Coffee planters will join in thanking Mr. Hamilton for his kindness in showing each year by means of samples what is being done in this important line of work, and we hope that next year he will be able to show us market samples of the various hybrid coffees growing on his estate.

FERTILISERS, ESTATE TOOLS, MACHINERY, &C.

Messrs. Parry & Co., Messrs. Peirce Leslie & Co., and the Potash Syndicate, exhibited collections of Fertilisers which were of great interest and educational value.

Messrs. Peirce Leslie, and Messrs. Harrisons & Crosfield exhibited estate tools, tapping knives, latex cups, etc., while Messrs. Siemen & Co., and Messrs. Marshall, Sons & Co., were good enough to take the trouble to erect a number of machines, including a dynamo, coffee huller, tea packer, etc. This is exactly the kind of exhibit which is wanted during these meetings and we trust that these enterprising Firms will reap a reward in comparison with the trouble they took.

MISCELLANEOUS.

A number of miscellaneous exhibits were displayed. Sisal Fibre from Chundrapore, Pepper from the same estate, Tea chests. sprayers, etc. Messrs, Forster & Co., showed a block of English Resin, garnished (as the cookery books say) with bars of Blue Soap, these being used as insecticides for Green Bug and other pests. This Firm and also Messrs. R. Maclure of Madras showed compact medicine chests containing all that is necessary for treating coolies on the estates.

To all exhibitors we extend our hearty thanks for helping to make our Exhibition a success, and for taking so much trouble to show us interesting things and for explaining them to us during the days the show was open.

Demonstration of the use of Dynamite in Agriculture.

On 29th and 30th August a trial was made at the Lal Bagh Gardens, with the use of explosives for loosening the soil. Messrs. Nobel & Co. supplied the explosive but were unfortunately unable to send an agent to conduct the experiments which were carried out by the Scientific Assistant for Mysore.

Holes were made 3 feet deep 12 x 12 and 6 x 6 and a cartridge exploded in each Not much effect was apparent but no doubt the sub-soil and lower layers were cracked. In order to find out what benefit has been produced Ceara Rubber is to be planted over the area treated and its rapidity of growth compared with plants on neighbouring untreated areas. This part of the experiment is being kindly carried out by Mr. Krumbiegel, the Mysore Economic Botanist.

Two attempts were made to blow up stumps but with little success. The explosive was not strong enough to lift a mango stump about 3 feet in diameter with two big side roots but it demolished the tap root and left it in a state in which a Jack would easily take it out.

At the same time that this demonstration was going on, the use of a Trewhella Jack was shown and a stump removed with it, and a demonstration of fumigating plants in the Lal Bagh Fumigatorium to kill Scale Insects on them was also given by Mr. Krumbiegel.

Visit to the Indian Institute of Science.

Owing to the kindness of the Director a visit to the Indian Institute of Science is becoming an regular event during the Annual Meeting of the U. P. A. and on Friday afternoon 29th August a number of Delegates and ladies accepted the invitation given them to inspect the laboratories of the Institute.

As in past years a most enjoyable and instructive afternoon was spent and the officers of the Institute personally conducted parties round the different Departments and explained their mysteries.

The Director and Dr. Watson again showed us liquid air and performed experiments to exhibit.the uses and properties of this product of a modern age of applied Chemistry. A modern electrical method of extracting pure Copper from solutions was shown us as also the spectra of the rare gases of the atmosphere and many other delightful things.

In the Department of Applied Chemistry the machines were at work for our benefit and a delightful afternoon closed in the library with tea and refreshments. To the ladies who so kindly received us and to Dr. Travers and all the Officers of the Institute our cordial thanks are due for an extremely pleasant and instructive afternoon,

Note on Antestia cruciata.

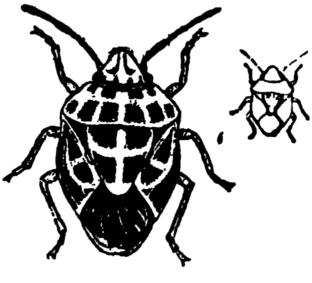
BY THE GOVERNMENT ENTOMOLOGIST.

Antestia cruciata, which was described as long ago as 1775 from Southern India, whence it had been sent to Europe by Dr. Koenig, has achieved a certain notoriety of late years as an occasional serious pest of Coffee, which it damages by sucking the berries. Specimens were sent from Craigmore Estate in March of this year by the Hon'ble Mr. E. F. Barber and I understand that this insect is well-known as a pest of Coffee in the Nilgiris. It is widely distributed in Southern India and probably has a wide range of food-plants, as I received it during the same month from Salem whence it was sent as damaging Jasmine plants in a garden. We also have it from Hillgrove, 5th September 1908, on Coffee; Coimbatore, in January, February, and August; and Madras city in February 1907. As is the case with so many of our common Indian bugs, the early stages do not seem to have been described, nor is the exact life history known in any detail, but it is probable that eggs are laid on leaves and twigs of the food-plant and that the young bugs spend their whole life, gregariously at first, on the plant. The dates given above appear to indicate two broods in the year, the adults being found in January—March, and August—September.

As regards remedial measures, collection by hand is probably the best method, the bugs being caught in a small hand-net made of a bag of mosquito-net or muslin fastened around the mouth to a ring of bamboo 'or light wood secured to a short handle, or being simply shaken off the bushes into pans containing water with a thin film of oil on top.

As in the case of most of these pests, prevention is better than cure, and a vigorous attack on all isolated individuals and small broods immediately they are noticed will usually save much damage by the larger broods which may otherwise occur later on.

To facilitate identification of the bug a figure of the adult insect is given here. The smaller figure shows the actual life-size of the insect; the larger figure is magnified to show greater detail. The colouration, roughly speaking, shows orange-yellow or reddish markings on a black ground-colour.



The scientific name "*cruciata*" refers appropriately enough to the cross-shaped mark on the scutellum (the shield-shaped portion in the middle of the figure), whilst those who prefer vulgar names may call this insect the "Coffee-berry Bug."

It has been stated that *Antestia cruciata* is identical with the Coffee-berry Bug of East Africa but this is not the case, although *A. cruciata* is very closely allied to the African Bug. This latter is *Antestia lineaticollis*. St. (=*variegata*, Th.) and a long account of its life-history, damage to Coffee, etc., by Dr. Schouteden will be found in the "Revue Zoologique Africaine," Vol. II, pages 20-26.

T. BAINBRIGGE FLETCHER, *Govt. Entomologist.*

The Metric System.

The Metric System is the simplest system in the world for the keeping of accounts, for measuring of land, dispensing of medicines, etc., and it is obvious that the British Empire, India included, will have soon to adopt it or lose part of their trade, as foreign nations refuse to understand their present measures.

Our old system is kept on because all the old records are recorded in it, and as people get on in years they say the system may be bad but change it in our children's time and not in ours. The son, however, also gets old and so it goes on.

It was proposed in Parliament a few years ago, but Mr. Lloyd George defeated the measure by saying it was not working properly in France. The fundamental measure in France is the ten-millionth part of a meridian line drawn from the pole to the equator and is 39·37079 English inches. The yard measure, the arbitrary fundamental standard of England, is embedded in the walls of the Houses of Parliament, the history of it is traced back to the Hebrews and Egyptains and then lost in antiquity.

It is my purpose to show how we can devise a British metric system of our own, simple. and obviating the loss of our old records.

To begin along the line of the least resistance, it appears the first thing to be tackled is our coinage, the basis of everything should be ten. The sovereign is the standard and is the only coin worth its face value, it is exchanged for 960 farthings, the farthings being tokens, it is proposed in Parliament that it should contain one thousand farthings, and to have a new coin worth 10 farthings and 100 farthings to be the exchange for a florin.

Farthings.

10	New Coin.		
100	10	Florin.	
1,000	100	10	Sovereign.

Pice.

10	New Coin.		
100	10	New Coin.	
1,000	100	10	Sovereign.

To equal this in India we have the sovereign containing 960 pice of 3 pies each ! so taking the pice as the basis and declaring 1,000 pice to be the exchange for a sovereign or Rs. 15 we should at once have a similar coinage.

The misfortune of this system is however that it ignores the pie, the pie has a buying value and is much used by the cooly, also the rupee would go, and new coins of value 2 annas 6 pies and Re.1-9 annas would have to be named and issued.

We have however one standard with which we could assimilate at once in the coinage of America, 5 dollars of which coinage are worth Rs.15-10 as. and the present value of 1,000 pice is the same, namely Rs.15-10 annas. Also if Government was to declare Rs.15-10-0 the exchange for one sovereign it would cut the Gordian knot at once, give us a decimal coinage in pice, and benefit the producer of India ten annas in each sovereign, as he would obtain that amount more for each sovereign of produce.

The alternate system is to use the pie and 5 Rupees. At present there are 960 pies in 5 Rupees, Government would have to demand 1,000 and issue a small gold piece value Rupees 5. This system would be far better than pice and sovereigns, as the cooly thinks in pie and it would be hard on him to abolish it.

The demanding of 1,000 pies for 5 Rupees or 200 for 1 Rupee would not affect anyone, the holders of 5 Rupees would find the exchange value still one-third of a sovereign, the 5 Rupees being gold, the holders of 1 Rupee would apparently gain 8 pies but prices would soon adjust that matter; Government also would neither gain nor lose, the pie being only a token as also the rupee.

Pie.			
10	Anna.		
100	10	Eight anna piece.	
1,000	100	10	5 Rs. gold.

4	Pisa.					
10	2½	Anna.				
40	10	4	Powly or Quarter.			
100	25	10	2½	Eight anna piece.		
400	100	40	10	4	Pagoda	
1,000	250	100	25	10	2½	5 Rupees.

In the pie and 5 Rupee piece system the present coinage could be maintained intact, the anna would be declared of value ten pies and the eight anna piece of value 100 pies, and the rupee of value 200 pies.

There are some who urge that the Indian counts in four and this is very true, the Pisa of four pies being the great system of the cooly and in this system they are accustomed to count up to 5 Rupees. There are four fingers on each hand representing the four castes. The despised pariah, the thumb, is separate and accordingly left out.

To assist their calculations it would be a good move on the part of Government to actually make a four pie or pisa piece and the calculations of the cooly would then be as in the above table,

THE MULTIPLICATION TABLES.

To turn now to the multiplication tables as their name implies they are a multiplication of trouble, they have to be learnt by heart, there is no connection the one with the other; they are the bugbear of the schoolboy and obsolete systems, as in dispensing medicines are still used in spite of new standard measures.

A pint of water is 20 ounces, of wine 16 oz. A stone in weighing a man is 14 lbs., in beef 8 lbs., in cheese 24 lbs. A firkin of butter 56 lbs., of raisins 112 lbs., and so on. For one hundredweight we have 112 lbs.; it is evident that the dealer of olden days required 12 lbs., extra as a gift when buying and so this error became incorporated.

The French system of weight is based on the gramme which is the weight of a cubic centimetre of water at the temperature of maximum density; it equals 15·412 English grains. It was adopted in France in 1799, it is not, however, necessary for us to slavishly follow the French but to adopt a simple system from our own measures and so keep in touch with our old records.

The English system is based on a pint of water which at 62° Fah. weighs a pound and a quarter and occupies a space of 34·65 cubic inches.

lb.		
100	Cwt.	
1,000	10	Ton.

lb.		
10	Gallon.	
1,000	100	Ton.

It would be simple to co-ordinate measures of weight and capacity as in the above tables. At present the ton is 2,240 lbs., and at 1s. a Cwt. one knows the price of a ton is £1 but as we are proposing to abolish the shilling and substitute florins we should also reduce the cwt. to 100 lbs. as in America and the ton to 1,000 lbs. as the minders do. For the Indian to co-ordinate his weights with the English, there is a good deal of difficulty as these alterations are the effect of time rather than the effect of Parliamentary decrees as witness Apothecaries' weight abolished in 1864 still being used to dispense medicines, the standard Avoirdupois being used for buying medicines only.

Of the new coins one should be made to be exactly the 40th of a lb. the rupee or tola being left as it is. 400 would then equal a gallon, and 4,000 a cwt., this exactly suiting the Indian counting in fours.

MEASURES OF LENGTH.

In measures of length, as I have put before, the French measure is based on a decimal of the meridian line, this is a standard which is fixed and can never be altered.

The British base theirs on the yard, a part of which, the inch, is the length of three barley corns placed in a line, one would think the barley corns would vary according to soil and cultivation, this is however as it may be; we have anyhow the surveyors chain of 66 feet containing 100 links, the link should be made the unit of length, there are ten chains in a furlong and should be 100 chains in a mile instead of 80.

Links.

100	Chain.	
1,000	10	Furlong.

Hands.

100	Gunta Chain,	
1,000	10	Hectometre or ⅕ Furlong.

With the link as the unit there is already a decimal system in the higher measures and the Indian has much the same. He uses a chain of 33 feet slightly longer than the French decometre of 32·8089 linear feet, and according to his system the gunta chain contains the breadth of one hundred hands measured below the fingers.

Most of the Indian counting is done by the hand, two clenched hands with outstretched thumbs represent a foot, pot tiles are made the length of the forearm with clenched hand and so on.

SQUARE MEASURE.

Links.

10,000	Sq. Chain.	
10	Acre.	
100	10	Sq. furlong,

Hands.

10,000	Gunta.	
	100	(Kandiga of 2½ acres.)

To complete the measure there should be ten furlongs in a mile and so one thousand acres instead of as at present 640 or the name mile could be altered to stade,

The Indian kundiga of 2½ is roughly the same as the French hectare the hectare being 5 perches or 1½ gunta smaller only.

The kundiga is an interesting measure and worked out to a nicety, it is one thousand hands each way, the amount of seed required for sowing is a heiro of 240 seers, the produce should be 240 bundles or coolie loads of paddy each bundle will make 4 sheaves of straw and contain 12 seers of paddy.

It is not necessary to dilate much on the great convenience a decimal system would be to the country. Ceylon already has 100 cents in the rupee. The keeping of accounts would be simplified by having only two columns for 5 Rupee pieces which might be called " Georges" and pies,

The 5 Rupee piece would be best for the majority in the country as the ideas of the coolie and cultivators do not soar much higher, and for the merchant and financier there would be a coin of anyhow a decent value different from the rupee and the third of a sovereign. Or there could be also a piece of value 50 for the financier.

In weights and measures a universal system is urgently called for, there is the railway maund, the sugar maund, the coffee maund. the jaggery maund, all of differeut weights with one name, also the seers of Madras, Coorg and Mysore are different, and when one is buying or selling one has to expressly ask or state how many lbs. or how many tolas there are in the maund or seer referred to, and all this entails time.

G. CREWE ORLEBAR.

RUBBER.

The Employment of Sodium Bisulphite in the Preparation of Plantation Rubber.

One of the most important points of difference between South American rubber obtained from *Hevea braziliensis* and plantation rubber obtained from the same tree is that while the first and best product in the former case is restricted to one grade or type *viz.*, fine hard, first quality rubber in the latter case may be prepared in one of four types, *viz* :—

(1) Smoked sheet or biscuit.
(2) Smoked crepe.
(3) Pale sheet or biscuit.
(4) Pale crepe.

The first two types resemble fine hard, inasmuch as they are smoke-cured. The two latter have no exactly corresponding products in South American rubber. The preparation of pale crepe in particular is confined to the plantation rubber industry. For this type of rubber there has been a strong demand during the past few years, a demand which does not appear to decrease at the present time.

In the preparation of pale crepe rubber the latex is coagulated in volumes varying from a few gallons up to 500 or 600 gallons. In subsequent treatment the coagulum may be cut up and worked in the machines, either as soon as coagulation appears to be complete (from two to three hours) or after an interval of 16 or 18 hours (*i.e.*, the following morning). The procedure varies according to the system of working adopted in the different estate factories.

In the earlier days of the plantation industry it was observed that the rubber allowed to coagulate over night darkened considerably on the surface ; in fact this darkening of the surface appears to be a natural process. It usually begins after a very short interval, and becomes more marked as the interval is prolonged. It is obvious that, if a piece of coagulum thus affected by a dark surface be passed through a washing machine, the final length of thin rubber will be characterised by dark streaks on a paler ground. In other words, the product will not be uniform in appearance. We do not propose in this paper to discuss whether the presence of these dark streaks affects the uniformity of the product with regard to actual quality.

To avoid any confusion of issues, it may be pointed out that dark streaks resulting from the darkened or oxidised surface of the original coagulum are not to be confounded with streaks due to the inclusion of particles of foreign matter. As already pointed out, the dark streaks we are considering appear to be due to a natural process of oxidation, and may vary in intensity according to the character of latices from different areas, whether the tree is tapped near the base or higher up the trunk, and also the age of the trees.

Even if the coagulum is machined before it shows definite signs of surface oxidation, it generally happens that oxidation progresses in the finished crepe or sheet until the rubber is dry, and possibly to some smaller degree after the rubber is dry.

As it was observed that a pale uniform product commanded a higher market price than streaked rubber of the same grade, it was apparent that it would be of great benefit to the plantation industry if some method could be devised whereby surface darkening could be inhibited. Managers of estates were at pains to discover some such means. The object was achieved in some cases by extreme dilution of the latex accompanied by quick coagulation, for which it was necessary to use large excesses of acid coagulant. In other instances a pale product was obtained by placing the freshly coagulated rubber in hot water for some little time. None of these measures were satisfactory and the proportion of pale rubber produced was small in comparison with the total output of first grade rubber, and what the rubber gained in appearance it lost in actual quality, sheets of rubber which had been immersed in hot water tended to stick together, and other difficulties arose,

In the course of investigation carried out in the laboratory of the Rubber Growers' Association in the Federated Malay States, it was found after numerous experiments that the desired end could be best attained by the employment of very small quantities of sodium bisulphite. A great number of experiments were made, and all samples were submitted to vulcanization tests in order that any possible effect upon the ultimate quality of the rubber might be detected. The results were so highly satisfactory that the use of sodium bisulphite was recommended in the bulletins issued by the chemists to all estates belonging to companies which were guarantors to the Malaya Research Fund. The almost immediate result was that it became possible for any estate to produce a very large proportion of its first grade rubber in the form of pale uniform crepe. At the same time the standard of average pale crepe was raised. The use of sodium bisulphite has since become common knowledge in the plantation rubber industry, and it would not be wide of mark to state that the vast majority of pale rubber now put upon the market has been prepared with the aid of that chemical.

The futility of using more than a minimum quantity has always been insisted upon, both with regard to the effect produced and the waste of money involved. It is only necessary to employ sodium bisulphite when the latex or the coagulum shows a tendency to darken rapidly. This tendency is more marked in some latices than in others, and it should be borne in mind that only the absolute minimum quantity necessary to counteract surface oxidation should be used. This quantity may be determined on any estate by simple experiment. In actual practice the quantity necessary has been found to vary from 1 part sodium bisulphite to 400 parts latex, to 1 part sodium bisulphite to 2,400 parts latex, or even less. The actual cost has been found to vary from 1·18*d.* to 1·72*d.* calculated per pound of dry rubber.

When it became known to buyers and manufacturers that sodium bisulphite was being employed in ths preparation of pale rubbers, there was some amount of opposition raised, and in one or two quarters it was definitely asserted that a continuation of the process would be prejudicial to the best interests of the plantation rubber industry. It was asserted that the use of sodium bisulphite had a tendency to make the rubber brittle, and in a number of instances instructions were given from London to discontinue the employment of the chemical in estate practice. Although such prejudice has abated somewhat the assertion that the sodium bisulphite makes rubber brittle is still made by those in the trade whose opinions carry soms amount of weight. At the same time the fact remains that rubber prepared by this particular process is bought eagerly and used largely.

We venture to refer here to the misuse of the word "bleached" in connection with rubber prepared with sodium bisulphite. The word "bleached" in common parlance means making white something which which is already of a dark colour, and sodium bisulphite is not used in this sense in the preparation of rubber. That is to say, the rubber is not allowed to darken and then bleached white again by the addition of sodium bisulphite. The probable action of the sodium bisulphite is that of an antiseptic in that it inhibits the fermentative changes which naturally take place when latex is exposed to air. Fermentative changes, if allowed to proceed unchecked, would be accompanied by and produce a darkening of the rubber.

Without wishing to appear as apologists for the use of sodium bisulphite on estates, it may be pointed out that the consumers themselves are responsible for the supply of rubber prepared with this chemical, as they showed themselves willing to pay a premium for pale rubbers of uniform colour. Whatever may have been the means adopted for inhibiting surface oxidation previously, it should be remembered that some artifice was resorted to, and that a naturally pale, unfirm rubber could not be regularly obtained without some such artificial aid. In advocating the use of sodium bisulphite we were convinced that we were offering a means which was simple, cheap, highly efficient and non-injurious. With regard to the statements made as to the harmful effects of the chemical upon the quality of the rubber produced, we are in a position to refute these by the results of continuous experimental work.

We have tested a great many specimens of rubbers prepared with sodium bisulphite, together with comparative samples similarly prepared, but without the use of sodium bisulphite. In the great majority of cases the difference between the figures obtained is very small, but on the whole the specimens prepared with sodium bisulphite are of a trifle better quality than those prepared without.

We give details of two pairs of samples taken at random from our testing book. The vulcanized rubbers are in one case twelve months old, and in the other six months, and the tests for tensile strength have been made within the last few days; any appreciable deterioration would have been apparent had such taken place.

TESTS MADE ON THE VULCANIZED SPECIMENS ONE WEEK AFTER CURING.

We give the actual experimental figures obtained with the Schwartz hysteresis machine on a strip 50 mm. long. Column I. is the extension limit produced by a given load (200 grms. per sq. m. cross sectional area), Column II. gives the increase in extension limit at the result of five consecutive applications of the load. Column III gives the sub-permanent set.

Ref. No.	Preparation.	I.	II.	III.
2689	Sheet without Sodium Bisulphite ...	78·8	39·8	10·8
2690	„ with „ „ ...	69·8	34·9	8·0
2941	Crepe without „ „ ...	80·8	42·5	8·9
2942	„ with „ „ ...	76·9	38·2	7·9

TESTS MADE ON PORTIONS OF THE SAME VULCANISED SPECIMENS WHEN 12 MONTHS AND 6 MONTHS OLD RESPECTIVELY.

Column IV. gaves the breaking strain. Column V. the elongation at moment of rupture, the original length being put to 1.

Ref. No.	Preparation.	IV.	V.	
2689	Sheet without Sodium Bisulphite ...	2966	9·96	12 months old.
2960	„ with „ „ ...	3250	10·05	
2941	Crepe without „ „ ...	3156	10·60	6 months old.
2942	„ with „ „ ...	3439	10·80	

It is not necessary to discuss these figures in detail, except perhaps to point out that under Columns I,, II,, and III the lower the figure the better the sample, and under Columns, IV, and V the higher the figure the better the sample. We merely wish to call attention to the comparative figures for the rubbers prepared with and without sodium bisulphite respectively. The difference in quality is always in favour of the sodium bisulphite prepared rubbers, and this also applies to a number of other comparative tests we have made. In a recent series of three or four rubbers, where the proportion of sodium bisulphite was progressively increased, starting with a specimen containing none at all, the quality improved with increasing proportions of bisulphite. As the amount added is in all cases quite small not exceeding one part per 400 of latex, it is not easy to suggest a theory to account for the differences observed.

Rubbers prepared with sodium bisulphite tend to dry more slowly than those not so treated. The effect is quite marked where unnecessarily large proportions of bisulphite are used, but with the very small quantities required in the generality of cases the effect is slight, and does not amount to more than a couple of days over or above the two or three weeks usually required for drying. It is just possible that the improvement in quality may be connected with the longer period required for drying.

The amount of residual sulphate in the rubber resulting from the use of the sodium bisulphite is very minute. Rubbers prepared without the use of sodium bisulphite frequently contain traces of sulphate, so that, if a trace of sulphate is found, it is not necessarily attributable to sodium bisulphite. The actual amounts found are usually too small to estimate with accuracy, but are generally less than '01 per cent., reckoned as sodium sulphate, and do not exceed '05 percent. These figures are small even in contrast with the natural ash of carefully prepared rubbers which vary up to '5 per cent. or more.

In conclusion, we have shown how sodium bisulphite has been found to be a cheap and effective agent for preserving the even, pale colouring of rubber, without in any way damaging or having a deleterious effect on the rubber, but rather the reverse. We are indebted to the Committee of the Rubber Growers' Association Research Fund for permission to publish these results.—*The India-Rubber Journal.*

CORRESPONDENCE.

The EDITOR,
Planters' Chronicle.

Green Bug.

Sir,—Your various correspondents have given a good deal of valuable information on the treatment of Geen Bug, and we in Mysore are duly grateful to them.

I now call upon the brethren in the Shevaroys, who have hitherto been silent, to " come over to Macedonia and help us " by explaining if possible why this pest has done less damage there than elsewhere. Is this due to the existence of enemies of the Bug in large quantities then elsewhere? Or to a vigorous spraying campaign *ab initio*? Or has the high cultivation which I believe Shevaroy Planters have mostly carried on helped their bushes to resist its depredations? Or is it due to natural advantages of any sort?

I have twice paid flying visits to Yercaud, and found that those with whom I had the pleasure of discussing Coffee matters were strong advocates of high cultivation ; but I also saw some some neglected—looking coffee in small gardens which, if highly cultivated, were distinctly ungrateful. I do not know who these belonged to, but would be glad to learn if they suffered more than the cared-for gardens and if our friends generally found that their liberal treatment of their coffee led to there being room for all —bugs and berries too.

Yours faithfully,
C. DANVERS.

The Planters' Chronicle.

RECOGNISED AS THE OFFICIAL ORGAN OF THE U. P. A. S. I., INCORPORATED.

(Secretary's Registered Telegraphic Address "Planting," Bangalore.)

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THE U. P. A. S. I.

(INCORPORATED.)

Contents.

The Scientific Department publishes an article of varied information interesting to the body of the planting community. We are still convinced that the use of Dynamite or some allied explosive will become general in opening up new land, and still more convinced that cartridges of lesser power will be used in cultivated land to improve the growing plants. Planters must not expect an upheaval of the soil, like a waterspout, but the ground below will be well fissured. Planters may jib at first at the cost, but they must remember that the effect is lasting, thus reducing the cost materially.

The Labour Problem has produced two letters from Mr. Danvers and C. J. H., of interest at this juncture. We trust that Mr. Danvers will not lay up his pen, as he foreshadows, but continue to instruct us from his long experience. His example, we hope, will be followed by others. We welcome C. J. H. as a new contributor to our columns, though the note he strikes is somewhat at variance with that struck by Mr. Danvers and Kithogue. Half annas will leave but little attraction for coolies who have become accustomed to the voice of the charmer.

We are greatly indebted to Mr. Bainbrigge Fletcher, Government Entomologist, for two interesting papers. The extracts he has kindly given us from the Official Year Book of the Commonwealth of Australia are of great value, coming so soon after the discussion at the annual meeting. The Secretary was instructed to inquire as to the possibility of Australia as a market for Indian coffee.

The other paper that the Government Entomologist contributes, which is on the Coffee Borer, will be of the greatest interest to all coffee planters, and its value is greatly enhanced by the illustration that accompanies it, from a block very kindly lent by Mr. Bainbrigge Fletcher, to whom we return our most sincere thanks, and, like Oliver Twist, "ask for more."

The Anamalai Planters' Association Proceedings are printed.

THE SCIENTIFIC DEPARTMENT, U.P.A.S.I.

Use of Dynamite in Agriculture.—At a Meeting of the Committee of Agricultural Experiments held at the Royal Botanic Gardens, Peradeniya, Ceylon on 10th July, Mr. Doolan, the Representative of Nobel's Explosives Company, Hamburg was present and he estimated the cost of blasting with Nobel's Hamburg Dynamite No. 1 as follows:—One case containing 200 cartridges ⅞ inch in diameter Rs.24, or 12 cents per cartridge; detonators Rs.19·50 per 1000, or 2 cents each; fuse about 1 cent per foot there being 24 feet to a coil.

Using for a two foot hole:—

Half a cartridge	... ...	6 cents.
One detonator	... ...	2 „
2 feet of fuse	... ...	2 „
		10 cents per hole.

Two coolies can put down 25 holes per hour, or 175 holes in a day of 7 hours, labour cost per each cooly 35 cents; 70 cents for two coolies; and two other coolies expert in making primers, charging holes and firing same at 50 cents each per day, Re.1, bringing the total cost of labour to Rs.1·70 per day, equal to 1 cent per hole. The total cost of dynamite, detonators, fuse, and labour is thus 11 cents per hole.

According to this estimate if the holes are put down 12 feet by 12 feet, as advised in articles on the subject, there will be 302 per acre, and the cost of the operation figures out at Rs.33·22 per acre.

From our experience at the trial made at the Lal Bagh Gardens, Bangalore, during the Annual Meeting of the U.P.A.S.I. the effect of even a whole cartridge leaves little to be seen. There is a dull heavy explosion which shakes the ground, a little dust is blown out of the top of the hole and a few cracks are seen on the surface. It is difficult to see what the effect below ground has been even on opening out a hole and presumably the benefit can only be discovered by watching the effect upon the plants over a period of years. Mr. Krumbeigel, the Mysore Economic Botanist, is kindly going to plant Ceará Rubber plants 6 x 6 over the area operated on at the Lal Bagh and compare their rate of growth with similar plants put down in the immediate neighbourhood of the blasted area. It must be remembered that the soil is a hard laterite,

The Scientific Assistant for Mysore who carried out the demonstration at the Lal Bagh hopes to try the effect of dynamite on soils with a hard pan in Mysore more especially with the object of testing the effect upon Black Rot. It is suggested that blasting may improve the drainage and so diminish the attacks of this fungus during the monsoon. It would appear, however, that whatever the effect the process is a fairly expensive one at Rs.33 per acre.

The Diplomatic and Consular Report for 1912 on Angola, a Portuguese colony on the West Coast of Africa just south of the Congo, states that the Brazilian valorisation scheme has considerably benefited the coffee estates in the districts of Cazengo and Galungo. The bulk of the coffee exported from Angola is gathered from wild trees that are found extensively n the mountainous forest regions at an altitude of about 2,000 feet. The arge estates continue to experience the want of labour for packing: in fact he greater part of this year's crop would have been lost had not the Government temporarily furnished some hundreds of natives from the neighbouring districts for that purpose. New varieties and hybrid coffee imported from Brazil and Java have not done as well as was expected, proving lees resistant to the ruling climatic conditions. The yield is small, but superior in quality: it is all consumed in the province.

The bulk of the Rubber for export depends entirely upon the amount gathered by natives in the interior; scarcity of food, drought, and tribal disturbances being the chief factors in the irregularity of supply. The total yield from the *Manicoba* quality, of which there exist some small plantations in the district of Loanda, has not been considerably augmented during 1912, owing to the labour difficulties ruling. No skilled labour exists for extracting rubber, the unskilled natives being too costly and unreliable to be taught more than the primitive task of weeding during the short terms for which they can be contracted. Rubber washing machinery of modern pattern has been erected on two or three estates where *Manicoba*, *Hevea*, and *Funtumia* are grown. Recently a French Firm set up several sets of rubber-cleaning machinery of the "Valour" type, which, however, only treat root rubber after it has been gathered and coagulated by the natives.

Ceylon.—The following figures from *the Ceylon Blue Book* for 1911-1912 may prove of interest to Southern India planters. The total area of the Island, is 25,331⅞ square miles and the total population 4,106,350. In 1911, 1,359 acres were planted with Coffee, 457,277 acres with Tea, and 184,551 acres with Rubber.

There are 7,592 Europeans in the Island and of Indian Tamils 301,400 men and 229,583 women.

The following figures for the average yield per acre of Tea are of interest:—

	Tea.
Colombo	1,400 lbs.
Kalutara	351 „
Kandy	464 „
Nuwara Eliya...	200 to 250 „
Galle	619 „
Badulla	497 „
Ratnapura	573 „
Kegalla	1,000 „

A Note on the Production of Tea in India in 1912, prepared in the Office of the Director-General of Commercial Intelligence, has recently come to hand. From this it appears that there was a total of 58,556 acres under Tea in Southern India in 1912 out of a grand total of 591,833 acres for all India The total production is put at 295,870,296 lbs. for all India excluding Burma, and the average yield per acre was 544·7 lbs. in 1912 as compared with 503·8 lbs. in 1911. Exports by sea increased by over 17½ million pounds during the year. The number of persons employed in the industry in 1912 is returned at 547,545 permanently employed and 95,509 temporarily employed, while the capital of joint stock companies engaged in the production of tea amounts to Rs.26·4 crores, or over £17·5 millions. The average price realised in 1912-13 was 8·65*d*. per lb. as compared with 9·04*d*. per lb. in 1911-12.

R. D. A.

CORRESPONDENCE

THE EDITOR,
The Planters' Chronicle.

The Labour Problem.

Sir,—I do not think that Mr. Martin does either himself or his hearers justice when he wrote (in your issue of 6th instant) that his efforts have been scoffed at as mere attempts to be funny. No one who has heard his speeches can have failed to be struck by the knowledge and ability displayed in them, and I am sure that all were very grateful for the humour which played about them and enlivened a somewhat dull subject. I can scarcely be said to be a convert to his views, having always failed to see how legislation can touch the real root of our trouble and though I have freely given admiration to the really stupendous efforts of some delegates, was never able to accord my support to their schemes, believing, with Mr. Martin, that these admirable efforts were in the wrong direction, and calculated to worry rather than attract labour. Even at this distant time I still gasp with admiration at the ability and labour involved in the production of one particular scheme; but notwithstanding my admiration for the qualities displayed, I was unable to support the bill.

What made me write at all was an apprehension that delegates were again going to waste their energies in discussing a fruitless theme—the indications pointed that way; and I hoped that some might agree with me, and stay their hands. I am glad to see that those apprehensions were wrong, and that a much more useful line was taken.

"Kithogue" is kind enough to approve of what I wrote, but says that I made no suggestion as to how we might meet the difficulty of the situation. I thought I had made a rather large and drastic suggestion, when I wrote that pay should be raised all round in order to get level with our rivals. That is what my remarks amounted to, I think; but rates must be settled by each district for itself. His idea of curtailing extensions would be a good one if there were the slightest probability of its being agreed to; but to make such a step effective Malaya and Ceylon must fall into line, and how are we to arrange this? And I feel sure that even South Indian Companies would only snort scornfully at the suggestion! The private proprietor is nowhere in such matters; and I may be doing them injustice, but it seems to me that companies think only of themselves, and "hang every one else." In Brazil we have an example of how such a suggestion is treated even after it becomes law. They seem there to have extended just as much as they wanted to, notwithstanding the Majestic Prohibition of it by the Legislature.

Mr. Martin says that once I did not like legislation because I was afraid of it—that is true, and it was in connection with Act I. I still dislike Act I intensely, notwithstanding the fact that when asked to propose its modified adoption at a North Mysore Association Meeting, I did so. We have passed a resolution to adopt the Act after it is modified to suit local conditions in consultation with the Government of Mysore, *who approached us on the subject.*

There are two or three reasons why North Mysore has had to change its attitude towards Act I, and some may be interested to know them.

One is, that the circumstances I foreshadowed 4 years ago at the U. P. A. meeting have come about, and we find that owing to our labour bolting with advances to other districts, we need extradition—and extradition appears to be hopeless of attainment without Act I. *With* extradition I personally shall still dislike the Act, as 50% of its good will be dissipated by Police short comings—*without* extradition it would be loathsome, and we want none of it. *But*, and here is another reason, the cloud, the size of a man's hand is now the size of a Govenment hand, and before long it is probable that the various Governments will make Act I the law of their lands, and cease leaving it to us to take or leave. So, we hope to get local modifications considered before the thing is sprung on us, willy nilly. That it is coming, I have no doubt whatever.

Three years ago, when proposing that an effort should be made to tap new sources of labour, I prophesied that owing to the awakening of the people of this country to the advantages of industrial pursuits other than agriculture; mines, manufactures, and miscellaneous industries would be our chief competitors for labour in the future. This has begun already to pinch one of our districts, and possibly more; for the fishing industry has, under the fostering care of Sir F. Nicholson, taken a good many coolies who used to come to Coffee. I shall not be suprised if " Kithogue's " forecast of the possible doubling of wages in the near future prove true, and even then we shall not find ourselves with more labour than we want.

Yours faithfully,

C. DANVERS.

The EDITOR,
Planters' Chronicle.
Bangalore.

Mysore Labour Problem.

Dear Sir,—I have no wish to pour cold water on the Labour Commission Scheme but I have doubts as to the success of it as regards Mysore unless we first make up our minds to face what I consider absolutely essential, and that is an increase of pay owing to increased competition and higher cost of living, chiefly due to export of grain.

Our source of labour is close at hand compared with many other Planting Districts, but we are losing our labour owing to better inducements elsewhere, owing to our proximity to the labour recruiting area. I myself believe that we can induce the labour to come our way by a very slight increase of pay. Many planters when referring to an increase deal only with annas, (easier to deal with in the Check Roll). I say let us start with the half anna. And now I come to what I consider a most important point, namely, that the employer and coolie should both benefit by the increase. When we decide to increase the pay let the increase only apply to coolies who do so many days work in the month. I would suggest 24 days for men and 22 days for women. I believe there is ample labour for us all but because the cooly refuses to work regularly the employers have to advance for 25% more coolies than they actually require to allow for that number or more sitting in. I believe if all the Planting Community throughout Southern India combined to work on this proposal we should in time induce the coolies to work more regularly, and eventually be able to work our estates with less coolies and therefore less advances.

C, J. H,

Office of the Government Entomologist,
Agricultural College and Research Institute
Coimbatore, dated 6th September, 1913.

Dear Sir,—I have tried to find out what I can about Coffee in Australia. The latest information we have here is contained in the "Official Year Book of the Commonwealth of Australia. Statistics for period 1901-1909. No. 3, 1910."

There is nothing here about Import Duties on particular goods, but Raw Coffee and Tea are apparently both subject to non preferential Customs Duty. They have preferential rates in the Commonwealth but such apparently only apply to imports from the United Kingdom, although a preference is also given to certain products of the South African Union.

The following information regarding imports into Australia during 1908 (the latest year for which we have information) may be of interest to you, as you will see that there is a certain demand for Coffee already to the value of over three lakhs of rupees :--

"*Principal Imports from British Possessions in* 1908 ;--

. . . . .

(iii) *Ceylon.*—Coffee and Chicory, £2,143; Teas £643,151. The large increase in the imports from Ceylon from £124,057 during the years 1887-91, to £681,950 in 1908 in due to the displacement of China teas in the Australian markets by those of India and Ceylon. Of the total imports of tea during the year 1908, 66·12 per cent. was the produce of Ceylon.

. . . . .

(v) *India.*—Coffee and Chicory, £22,413 ; Tea, £216,345."

"*Principal Imports the Produce of Foreign Countries* :—

(iv) *China.*—Tea, £87,903.

The decline of the value of imports from China during the last twenty years is due to the loss of the tea trade, which now draws its supplies mainly from India and Ceylon.

(ix) *Java.* Tea, £21, 443."

As regards the production of Coffee in Australia itself, the following extract is of some interest :—

"*Coffee.*—Queensland is the only State of the Commonwealth in which coffee—growing has been at all extensively tried, and here the results have up to the present time been far from satisfactory. The total area devoted to this crop reached its highest point in the season 1901-02, whan an area of 547 acres was recorded. Since then the area continuously declined to 1906-07, when it was as low as 256 acres. During the season 1907-08 an imporvement occurred and the total was 304 acres, succeeded by a fall to 285 acres in 1908-09 with a yield of 116,293 lbs. valued at £4,361." The small area suitable for Coffee-culture and the difficulties of getting labour for picking seem to prohibit Australia from any large share in Coffee-growing, so that the possibility of an Australian market for Indian Coffee would seem worth further investigation.

Yours truly,

T. BAINBRIGGE-FLETCHER,
Govt. Entomologist.

THE IMPERIAL COUNCIL MEETING AT SIMLA.

The Insect Pests Bill.

Sir Edward Maclagan, introducing the Insect Pests Bill, said :—

The Government was addressed some years ago by the Bombay Chamber of Commerce, who pointed out that most other countries had protected themselves by somewhat stringent measures from the damage done to agriculture and gardening by the introduction of destructive insects and other pests. They urged upon us that with the increase of communications, the time had then come when similar precautions should be taken in India. On receipt of this representation, we consulted our experts and ascertained that in several cases disease had already been introduced along with imported material, and that there were many destructive diseases in other countries which were likely to be introduced into India if no restrictions were imposed. We further ascertained from the Customs authorities that a considerable number of packages containing fruit, bulbs, roots, seeds and plants were regularly imported into India, and it seemed clear that if steps were not taken to control such importations, considerable loss might be occasioned to agriculture and fruit culture of this country. Our next step was to consult the various local Governments and through them to obtain the opinions of several Chambers of Commerce, Superintendents of Botanical Gardens and other botanical experts, fruit growers, tea and coffee growers, and planters' associations. These opinions upon receipt were laid before a Committee of Experts, who then submitted definite proposals for dealing with the question. We had originally proposed to impose the necessary restrictions by a notification under the Sea Customs Act of 1878, but we found that the terms of that Act did not adequately cover the case with which we had to deal. We decided, therefore, to resort to special legislation, and the present Bill has been accordingly prepared, under which the Government is armed with the powers necessary for the purpose. After preparing this Bill we ascertained that a Conference was to meet in Rome in April, 1913, to discuss this very subject. We, thereupon, nominated one of our officers to attend the Conference and took no further action with regard to the Bill pending the receipt of the recommendations of the Conference, but as the Conference was afterwards indefinitely postponed, it was decided to proceed with the Bill as it stood.

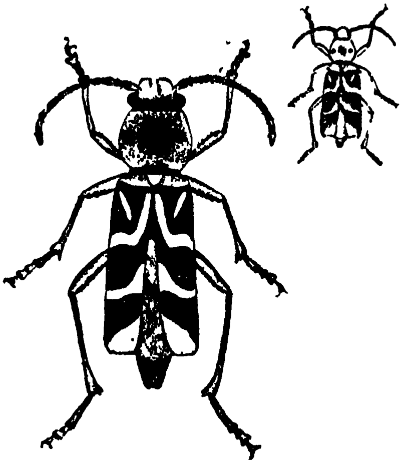
The provisions of the Bill are based partly on the corresponding English Acts of 1877 and 1908, and partly on the Indian Livestock Inspection Act of 1898. They give the Government power to regulate, or, when necessary, prohibit the import of specified articles, which cannot be unreservedly introduced into the country without entailing a likelihood of danger to crops and gardens. This power, I need hardly say, will be used with discretion and applied only to a case where its exclusion is considered to be really necessary. In some cases, we should probably require a certificate from the country of exportation, that certain diseases are not prevalent in that country, or in the neighbourhood where the crop was grown, as the case may be, and in others we shall need a licence by the Agricultural Department in this country, which would be given on satisfactory evidence as to the reliable character of the merchants from whom the stock was received. In another class of cases, it will be necessary to go further, importation being confined to certain ports and arrangements being made for subjecting the suspected article to fumigation. Our object is to deal with them effectively, so as to save the Indian agricultural and fruit-rearing industries as far as possible from the more serious charges of loss to which they are exposed from the present system of unrestricted importation.—*The Daily Post.*

COFFEE.

Note on Coffee-Borer.

By the Government Entomologist.

Xylotrechus quadripes is sufficiently well-known in most Coffee Districts in the larval state as the "Borer" or "White Borer" of Coffee and I must confess that I was considerably surprised to find that several experienced Coffee planters were quite ignorant of its appearance in the adult state as a beetle. It may therefore be as well to take the opportunity to figure the beetle in the "*Chronicle*," so that all Coffee-planters may be able to recognise it when met with, as it is obviously better to catch and kill the beetle before it has had a chance of laying its eggs than to wait for the damage to be done by the resulting larvae and then have to cut these out. On many estates it is the regular practice to have these beetles collected by hand and killed at the time of year (usually about March and October) that the adult beetles occur. They are generally found low down on the stem of the bush, about ground-level, where the eggs are laid as a rule.



The smaller figure shows the life-size of the beetle, the larger one shows the markings and structure in greater detail. The wing-cases are slightly opened showing the wings and body underneath; they may of course be closed so as to meet one another across the back, in which case the white cross-bars are continuous.

If some of those Coffee-Planters who have been successful in their control of the Borer would give their practical experiences in the *Chronicle* it would probably be of considerable interest to all readers.

T. Bainbrigge Fletcher,
Govt. Entomologist.

8—9—13.

Coffee Statistics.

The following information is extracted from the *Diplomatic and Consular Report* for 1912. The Coffee exported from Costa Rica during 1911-12 amounted to 196,211 bags of which 50·26% were shipped in husk. The export was 10,398 bags less than that of the previous year. The 1912 13 crop has turned out to be about equal to that of 1911-12. It was very good on the Atlantic slope and medium to poor over the rest of the country.

DISTRIBUTION OF THE COFFEE CROP OF 1911-12.

	Quantity.	Total.	Percentage by Bags.
	Bags.	Bags.	
United Kingdom and Colonies—			
In husk	81,278		
Cleaned	73,422	154,700	78·84
United States—			
In husk	720		
Cleaned	10,415	11.135	5·70
Germany—			
In husk	15.785		
Cleaned	8.008	23,793	12·11
France—			
Cleaned	5.580	5,580	2·84
Other Countries—			
In husk	835		
Cleaned	168	1,003	0·51
Total—			
In husk ...	98,618		
Cleaned ...	97,593	196,211	100

In 1911-12 exports of Coffee from Venezuela amounted to 55,697 metric tons against 37,153 metric tons in 1910-11 (1 metric ton =) scarcely any Venezuela coffee is sent to the United Kingdom, the greater part going to the United States, France and Germany.

Articles.	Country.		Quantity.	Value.
				£.
Coffee—	United States	M. tons ...	18,767	1,064,600
	France	,, ...	16,976	905,260
	Germany	,, ...	11,209	664,830
	Spain	,, ...	4,377	249,520
	Netherlands & Colonies ...	,, ...	1,387	84,660
	Austria Hungary ...	,, ...	1,462	77,590
	Italy	,, ...	796	41,310
	Belgium	,,2 ...	286	15.410
	Cuba	,, ...	157	7,700
	United Kingdom & Colonies	,, ...	76	4,570
	Panama	,, ...	3	170
	Total	...	55,667	3,115,620

Coffee is the most important product of Western Abyssinia. It mostly grows wild and immense forests of it exist unutilised in the provinces of Gama and Kaffa, whence the name of Coffee, Arabs having exported the berries of the tree calling it the tree of Kaffa. The quantity picked is utterly incommensurate with that grown, but more ground is cleared every year. Nearly all this coffee is sent to, and consumed at, Khartoum; in quality it is far superior to the Brazilian. It is interesting to note that Abyssinia Coffee is now being exported through Gambela and the Sudan to Egypt, coffee to the value of £4,524 having been exported in the first nine months of 1912. Plantations of Coffee should be made on the platcan near Gambela itself to make a really big and profitable trade. There is sufficient water for irrigation; and coffee of a superior quality could be grown. The climate is also good. It might be worth while for an expert in coffee to come up by the first steamer to Gambela in June and see the prospects. Hawaii coffee is mixed with Mocha at Aden and sold as long berry mocha,

RUBBER.

Manihot and Hevea.

Manihot et Hevea —Journal d'Agriculture Tropicale. Year 13, No. 139, pp. 7-10. Paris, January 31, 1913.

In an article signed F. V. (1) the question of the advisability of cultivating Manihot and Hevea side by side was raised and answered affirmatively. Further, as M. Girard, who has practised this mixed cultivation in Cochin-China since 1910, using *M. dichotoma* and *pianhyensis*, asked for information respecting the best methods of tapping, for only by means of applying tapping methods entirely satisfactory to himself, would he be able to give, in his turn, interesting information on the mixed cultivation of Manihot and Hevea in Cochin-China and on the results of his experiments in incising Manihot trees. It was thus useful to add to the information which M. F. V. was able to furnish on this subject the data collected by M. V. Cayla in the course of a visit to the Brazilian plantations of various species of Manihot.

The following method is advocated by M. F V. as the result of his practical experience on the Congo.

1. The thick bark of the trees should be removed in order to obtain a smooth clean surface.
2. The trees should be divided into 4 sectors and the incisions made in the form of half a fish-bone to a height of 6 feet 6 inches from the foot of the tree and 6 inches apart.
3. One sector must be incised per day and the next day the scrap should be removed, the incisions being sprayed with Bordeaux mixture. As soon as the cuts have cicatrised, the process is repeated, the new incisions being made below the former ones.
4. The best time for tapping is before 8 a. m. but it can be continued during the day in the case of trunks in the shade.
5. An ordinary implement is used, care being especially taken to avoid injuring the cambium.
6. No tree should be tapped till it is 4 years old.
7. The latex should be allowed to coagulate without being disturbed, and preferably in the form of "crepe".

M. V. Cayla states that in Brazil in the State of Rio Janeiro, it is necessary to remove the thick bark from *Ceara* trees (*Manihot Glaziowii*) of from 7 to 8 years of age, or more, in order to make clean-cut fish-bone incisions. In the case of the other species of Manihot, a rapid and slight scraping with the cutting knife is all that is requisite.

M. Glaziowii is tapped with a "machadinho" (1) according to the method of the "seringueiros", but *M. pianhyensis* ("pianhy") and *M. dichotoma* ("jequie") are treated in a still rougher manner; while the latex from *M. Glaziowii* is collected in receptacles ("tigelinhas") suspended from the trees below the incisions, that from *M. dichotoma* flows into a vessel at the foot of the tree, while the latex exuding from *M. pianhyensis* flows into a hole dug in the ground.

The fish-bone incision is not practised in Brazil, where it would not be economical in the case of *Ceara* on account of the peculiar nature of the bark of this tree.

But the diameter and height of the Manihot trees depend on cultural methods, which seem to be completely ignored in the State of Bahia, where the want of care taken does not permit of stating with accuracy the height to which incisions can be made. The trees are tapped as high as possible; small incisions can be made in nearly half the circumference of the trunk of *M. dichotoma* without causing any injury to the tree.

As for the age, it is better not to begin tapping too early. Nevertheless, *M. pianhyensis* is often tapped when 2 years, or even 18 months old and the dead tree is replaced by a fresh productive tree grown in 6 months by filling up the gaps with slips.

The rubber from the Brazilian species of Manihot coagulates of its own accord: its quality is good and it fetches a high price. It is, however, deficient in purity, but this might be remedied by filtering the latex before coagulation, pressing and drying the coagulum with care.

(Monthly Bulletin of Agricultural Intelligence and of Plant Diseases.) April 1913.

DISTRICT PLANTERS' ASSOCIATIONS.

Anamalai Planters' Association.

The Minutes of a Meeting of the General Committee held at the Monica Bungalow at 10 a.m., on Sunday 10th August, 1913.

PRESENT.—Mr. G. L. Duncan (Chairman), the Hon'ble Mr. E. F. Barber, Messrs. C. R. T. Congreve, E. W. Simcock and J. Hatton Robinson (Honorary Secretary).

AGENDA.

1. To consider reply to the District Magistrate—as to whether the Madras Planters' Labour Act of 1903 should by extended to this District.
2. To decide what policy the Association should adopt regarding the proposed extension of Government Cinchona plantation in the District.
3. Telegraphic communication to the District; and postal affairs.
4. Public Bazaar for District.

(1) The Meeting was not unanimous on the subject. The Honorary Secretary was requested to reply to the District Magistrate and ask that the subject might again be referred to a General Meeting.

(2) The Meeting was strongly opposed to the extension of Cinchona Plantations in the District. The Planters in the district were prepared to plant up Cinchona at the request of Government. A Minimum unit should be fixed.

(3) In reply to the Revenue Divisional Officer's latter C No. 451/Supr. of 1913 dated 27-7-13.- The Association did not now consider that the Telegraph line extended only to Malayandipatnam would help the district much—and would rather guarantee for the extension of the Telegraph line up to Valparai - and suggested that the same be carried up the Ghaut on the "Tree to tree" system.

The Hon'ble Mr. Barber was requested to very kindly interview the Postmaster-General about the Valparai Post Office.

(4) It was unanimously agreed that 50 acres of the Block of land known as K 2 be cleared for a Public Bazaar, and that an application be sent in to Government for permission to do so.

It was also agreed upon that the Buildings erected on the above Public Bazaar site be built out of Association Funds.

(Signed) J. HATTON ROBINSON,
Honorary Secretary.

The Planters' Chronicle.

RECOGNISED AS THE OFFICIAL ORGAN OF THE U. P. A. S. I., INCORPORATED.

(Secretary's Registered Telegraphic Address "Planting," Bangalore.)

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THE U. P. A. S. I.

(INCORPORATED.)

Contents.

An article, very interesting to all Coffee Planters, is published by the Planting Expert, who extracts from Mr. Butcher's Report and from notes supplied by Mr. J. G. Hamilton (who by the by advertises some hybrid seeds in our columns).

The plan of the Experimental Plot, kindly furnished by Mr. Butcher, with marginal notes makes the whole very clear.

We call special attention to the Resolution unanimously passed by the Wynaad Planters' Association at a largely attended meeting, as to the "*urgent necessity*" of a Labour Commission for South India.

The Scientific Department publishes an article on the Ant Repellent which contains the gist of a Report of the Results of a Report emanating from the American Bureau of Entomology. We hope that some planter will try the "ant tape" and send a report on the result. It will be noticed that the hot weather is the best time to try this experiment.

We publish a long letter from Mr. Mead on the question of Labour generally, which also criticises the effects of the Labour Committee's Report. We personally do not agree with most that Mr. Mead writes, specially in regard to the proposed Labour Commission. It strikes us as too parochial: but we are glad that he recognises the efforts of the Labour Committee to settle a very troublesome question. We think that the planting community will do well to concentrate on this one most important point, rather than have their minds diverted by the red herring drawn across the trail in the last para of Mr. Mead's letter.

Mr. West addresses us on the Labour Problem, but when he talks of wages, he somewhat contradicts himsef in the two first paras of his letter. Nor do we gather from Mr. Mead's letter that he considers extradition from Native States as the universal panacea against absconding coolies and loss of advances.

We reproduce the first portion of an article on Tea in 1699, which gives the history of the introduction of tea as a beverage into England.

Scientific Officer's Papers.

CXXII.—COFFEE HYBRIDISATION WORK IN SOUTHERN INDIA.

Work on The Experimental Plot in the Nilgiris was begun in 1912 and Mr. F. H. Butcher, the Curator of Government Parks and Gardens, the Nilgiris, who is co-operating with the Planting Expert reports on it as follows in the *Annual Administration Report* for 1912-13:--

"The work of planting up the plot was commenced in April last, when coffee hybrids kindly given by Mr. Rhodes James were planted at the bottom of the plantation—*Vide* plan below.

"These are all doing well and made splendid growth during the year.

"The larger portion of the plot was not planted until November during the North-East Monsoon, when planting conditions on the part of the Nilgiris are most favourable. The following kinds of coffee were then planted:—

(1) Coffee robusta.
(2) „ Arabica (two kinds).
(3) Mocha.
(4) Maragogipe (two kinds).
(5) Maragogipe.
(6) Hamilton's third generation.
(7) „ second generation.

Each variety is alloted a space of 36 x 48 feet and each one of these divisions is labelled A B or C and so on to the end of the plantation. Each plant in every square is lettered and numbered on a plan. a copy of which is reproduced on the next page. By this method each individual plant is known, and when hybridisation commences these letters and numbers will be used in recording the crosses. The X marked on the plan shows the position of the posts denoting each variety. These posts are well made structures having four arms each which point to the division containing the variety written on the arm.

"The blank places noted on the plan on the next page denote the position where a plant would have been planted if the spot had been favourable or a plant available. Some of these blanks will be filled in when plants are available.

"A large notice board has been erected on the road side so that the public wishing to enter the plantation can easily find the entrance."

This year it is intended to fill up the vacancies and to plant up another small block with one or two other varieties. It will be noticed that the plants are planted widely apart, the object being to allow plenty of room for netting the trees and working round them when actual cross fertilising work comes to be done. There is nothing more to be done now until the trees are old enough to flower and bear seed.

In Coorg Mr. A. H. Jackson is carrying out some special experiments with Hybrids under estate conditions, and the new clearing of hybrid plants are making most excellent growth.

In Mysore, systematic work has been continued over a long period of years with Coffee Hybrids at Chundrapore Estate, and the following account of the progress made has been compiled from notes kindly supplied by Mr. J. G. Hamilton.

Very little was done during 1912-13 as Mr. Hamilton himself was away and the 1912 clearing was planted in such a confused way in his absence that it will be difficult if not impossible to pick out the different types.

This year, 1913, another small clearing has been made of third, fourth, and fifth generation Hybrids, and also some Golden Drop. British East Africa Ordinary, and British East Africa Jamaica Blue Mountain, *i.e.*, coffee grown near Nairobi from seed imported from Jamaica.

PLAN OF COFFEE-HYBRIDISATION EXPERIMENTAL PLOT AT BENHOPE.

(1)	(2)	(3)	(4)	(5)
1·	1·	1·	1·	1·
2·	2·	2·	2·	3·
3·	3·	3·	3·	2·

(1) 3 plants B. H. I.
(2) 3 do B. H. II.
(3) 3 do Robusta.
(4) 3 do Saklaspur.
(5) 3 do Hamilton's V.

Hybrid Coffee from Mr. Rhodes James

A			B		
a 1	a 2	a 3	b 1	b 2	b 3
a 4	a 5	a 6	b 4	b 5	b 6
a 7	...	a 9	b 7	b 8	b 9
a 10	a 11	a 12	b 10	b 11	b 12

A Coffea robusta.

B Coffea arabica.

C			D		
c 1	c 2	c 3	d 1	...	...
c 4	c 5	c 6	d 4	d 5	...
c 7	c 8	c 9	d 7	d 8	...
c 10	c 11	c 12			

C Coffea arabica.

D Mocha coffee.

E			F		
e 1	e 2	e 3	f 1	f 2	f 3
e 4	e 5	e 6	f 4	f 5	f 6
e 7	e 8	e 9	f 7	f 8	f 9
e 10	e 11	e 12	f 10	f 11	f 12

E Maragogipe coffee.

F Maragogipe coffee.

G			H		
g 1	g 2	g 3	h 1	h 2	h 3
g 4	g 5	g 6	h 4	h 5	h 6
g 7	g 8	g 9	h 7	h 8	h 9
g 10	g 11	g 12	h 10	h 11	h 12

G Hamilton's 3rd generation.

H Hamilton's 2nd generation.

Each Block of these varieties is divided from those surrounding it by paths or roads so that in three or four years there is a prospect of having a fair number of trees under proper observation. In the case of the fourth generation plants the bulk has been so planted that the progeny of different known trees of the third generation from which the seed was derived can be separately watched.

Many of the old trees of the third generation appear to be slow in responding to blossom showers and the fifteen and twenty cent showers which often damage the Arabica crops leave these hybrids untouched. On the other hand if the ground is at all hard thirty cents of rain is insufficient to bring out their blossom. Their growth appears to be slow at first but when once tney become established they make rapid progress. Their progeny is not quite so much inclined to sport as that of the earlier generations but a good many do so and only a few trees have been selected and marked for seed bearing purposes.

Selection has not been so thoroughly carried out among the old fourth generation hybrids but all bad trees are discarded.

The fifth generation hybrids show much more uniformity but as they are still very young no seed has yet been taken from them and only a little will be selected this year. As far as present observations have gone these fifth generations plants are more responsive to rain than earlier generations but still less so than the ordinary Arabica coffee. They bore a very heavy crop at two years old but this year had bad luck in rain, and they received no cultivation so that the present crop is a small one The sample of coffee prepared from them and sent to London last year was not much liked there, but a smilar sample sent to Havre elicited a very favourable report and was valued in March 1913 at 73s. 6. c.i.f.

When considering the results obtained with these hybrids it must be remembered that up to the present year none of them have been planted in ordinary good soil but they have always been used to fill up bad corners where nothing else would grow. The consequence is that they have had a hard life and bad conditions and deserve credit for having lived at all

With the advent of Green Bug in Mysore and Coorg it may become necessary to reconsider the question of which generation and type should be chosen for seed bearers, and in view of this, about two acres more of third generation plants have been put down though it was not originally intended to plant any more of these.

Hitherto in selecting parents while absolutely rejecting anything showing very marked Arabica characteristics, plants showing even somewhat excessive Liberica character have also been rejected. This has tended to reduce the coffee produced gradually towards the Arabican type. This was readily seen by the series of samples exhibited during the Annual Meeting of the U. P. A. S. I.

Even among the fifth generation plants Mules may be expected though none have been noticed as yet. There are many among the third generation plants and a few among the fourth. It is generally possible to detect these and eliminate them quite early in their lives.

It was noticed this year that where there was ' paddy ' it was pink on all generation.

RUDOLPH D. ANSTEAD,
Planting Expert.

Wynaad Planters' Association.

That this Meeting is unanimous in considering that the institution of a Labour Commission for South India is an urgent necessity, and that the members present agree to represent the position to their Proprietors, recommending them to allow the Estates they are in charge of to join the scheme if it is found that the promises of support justify the establishment of a Commission on the lines suggested in the report of the Committee appointed by the United Planters' Association of Southern India.

Proposed from the Chair, and carried unanimously,

THE SCIENTIFIC DEPARTMENT, U.P A S.I.

An Ant Repellent.—Under this title an article appears in the September number of the *Tropical Agriculturalist* which is of great interest to Coffee planters who are faced with a campaign against certain species of Ants. in their endeavour to keep the Green Bug in check in Coorg and Mysore. The article in question gives the results obtained by the Experts of the American Bureau of Entomology in their war against the Argertine Ant (*Iridomyrmex humilis*). This Ant is one of the many instances of an introduced pest as it was introduced into America from Argentine in the course of commerce. Not only is it a serious household pest but it feeds on the excreta of scale insects as do the Red Ant and others in this country, and like these, it protects the scales against their natural enemies The result of this has been that Scale Insects have multiplied to such an extent that orange growing in the infested parts of the Delta of the Mississippi has been rendered unprofitable.

The American Entomologists have found that the only repellent which would remain efficient for any length of time was dry Corrosive Sublimate. In order to use this an " ant tape" is prepared as follows:—Corrosive sublimate is heated with water in a *porcelain* vessel till the maximum amount is dissolved. This solution is allowed to cool and it is then filtered and in the clear solution thus obtained ordinary cotton tape is soaked for several hours. It is then wrung out and pinned up on a wall to dry. In making the solution of corrosive sublimate it must not be allowed to come into contact with Iron or tin, nor must the tape be allowed to do so, as there is a chemical action between the Mercury in the Corrosive sublimate and these metals.

The ant tape prepared in this way is fastened round the legs of tables, along the edges of shelves &c and it is found to remain effective for as long as eleven months *provided it is not allowed to get wet.* Corrosive Sublimate is a very pöisonous substance and the usual precautions in using a poison must be observed.

It is possible that the use of this tape might be practicable to protect sprayed coffee tress from the visit of Ants carrying young scale insects at any rate in the dry weather which is the time when the attack of the latter is most violent and the Scientific Assistants should experiment with this method.

Rubber Pavements.—With the falling price of Rubber and the discussion as to new uses for it the question of its possible utilisation for street paving is a most interesting one. From an article on the subject in the *India Rubber World* it appears that there are three existing rubber pavements in London, the court yards of the Savoy and Claridge's Hotels and the approach and exit of Euston Railway Station. The hotel pavements have been down ten and thirteen years respectively and that at Euston has been down thirty two years. The former was 2½ inches thick and the latter two inches and in all cases the wear has now reduced them to about half their original thickness so that the experiment would appear to be a complete success..

The last issue to hand of the *India Rubber Journal* quotes the *Scotsman* as saying that the rubber paving laid down on the Dessau system in the New Kent Road is so far a success. After three weeks experience the traffic has not moved the sheeting from the wood in any way, but when a weighty vehicle like a traction engine with broad double tyred wheels stops upon it dead there is too little grip, and when a start has to be made again the wheels fly round until some sand is thrown under them. This objection is confined to the section where the blocks are not keyed.

R. D. A.

CORRESPONDENCE

THE MOOPLY VALLEY RUBBER COMPANY, LTD.

Palapilly P. O,

September 22nd, 1913.

THE EDITOR,

The Planters' Chronicle.

Labour.

Sir, I am in receipt of the Report of the Labour Committee of the U. P. A. S. I. and take the liberty of asking for the hospitality of your columns to place my views on this matter and on Labour matters generally before the Planting Community.

Legislation.—I have been and am a consistent opponent of this and am more sorry than I can say that Mr. Danvers is becoming or thinking of becoming an unwilling convert.

The delusive bait of extradition appears to be the lure responsible for his capture. Let me warn him, instead of a succulent may-fly, he will find a bundle of dry feathers and an exceedingly sharp look.

My way of looking on legislation is shortly this. No Act can possibly be framed which does not start from the fallacy that the cooly, maistry and planter are equally honest (or dishonest) and solvent, *ergo* no Act can be framed that is of any use to the Planter.

As to Extradition, I have an interest in a tea place in a Native State and a cooly can bolt any night into British India whence there is no extradition. Theoretically I should annually have an apalling list of bad debts. In practice a planter takes more care as to whom advances are given and the maistry takes more care as to whom he advances in the villages.

Further if a cooly does abscond there is still the finest tribunal ever possible to help the maistry to recover the advance *i.e.*, the village tribunal the only court that can have any real knowledge of the claims and counter-claims between cooly and maistry.

Now if Extradition is so necessary for our salvation it will be obvious that those fortunate districts in South India that bask in the security of the Act will be immune from bad debts as long as they recruit from British India. Is this a fact?

My old friend Mr. J. A. Richardson with whom I have often argued matters says "Yes, but we must protect ourselves against crimping in our own districts and in other districts:" Truly an awful confession. We planters must run to legislation to keep ourselves in the narrow way of honesty.

So much for Legislation and Extradition.

Shortage of Labour and its Causes.—It is obvious to anyone that it was impossible not to disturb labour conditions when the last few years have shown such enormous demands for fresh labour to open up huge areas in rubber and other products. The man who was there first says "New places should find new labour and not interfere with ours." How impossible this is in practice, men like Mr. Martin know. There are not many districts within a reasonable distance which have not been tried and recruited from for years. Recruiting in districts from which estate labour is already drawn is bound to lead to what is ever present in any business—COMPETITION. I do not believe there has been any deliberate attempt by South Indian planters to crimp coolies from planters in other districts though there have been undoubtedly numerous cases recorded where the professional recruiter for countries over-seas has been deliberately guilty.

But beyond a sudden demand increasing competition there are other factors that must not be lost sight of. Take the price of food stuffs for instance. This reacts both ways. Firstly, there is a greater demand and consequently a rise in wages in the plains, secondly, there is a smaller balance between the cooly's wages and his cost of living when on an estate.

A good deal of harm has also been done to the Labour market by what I may term the ignorance of large and wealthy firms starting operations in South India. In other planting countries such as North India, and the F. M. S., to instance only two, money will provide labour. In South India labour has to be made, and connections worked up, in short labour cannot be bought. But the effect of lavish and wild advancing is not only felt by the firms who put out these advances but by the whole community. There should in South India be no real necessity for high advances but planters have had to raise their scale or be left without coolies. Again competition,

Again the rubber boom and large extensions made in tea has naturally increased the demand for planters and has resulted in planters shifting from one billet to another in a way that was unknown a few years ago. I know of nothing more likely to unsettle labour than this. Without wishing to be misunderstood in any way. I maintain that labour is not worked as well as it used to be, and planters are not as a body in such intimate touch with their Labour as was the case some years ago.

We now come to Foreign competition. Mr. Martin, in season and out of season, has preached the necessity for fair competition and for the absolute necessity if this is to be secured of having the emigrant cooly's interests protected BY GOVERNMENT. As a body we have assented but not pressed the point as it should have been pressed and as it still should be pressed. All of us who have seen anything of recruiting in the plains can remember how the country was overrun with blackbirders and crimps.

We remember the fulminations of the Ceylon Editors over Mr. Martin's overseas circular and know that the sole reason why it was considered so objectionable was that every word in it was true and every statement embodied was taken from evidence given by Ceylon planters at their own Labour Commission. A certain number of abuses then rampant have been done away with and the Ceylon papers have kindly informed us that if we care to try and better our labour conditions they will not object. It is still the duty of the Madras Government to let the cooly know exactly and without exaggeration either way what he can expect when he has crossed the sea to one or other of the much advertised Eldorados. I am informed that the F. M. S. planters have agreed to reduce wages. I make the statement for what it is worth. If this is a fact and it applies to coolies already in the country and such coolies have been imported under a direct understanding as to wages, working hours, etc., I can only say it amounts to a distinct breach of faith, and is a subject that ought to be inquired into by the Madras Government. There are other points on which I should like the cooly to be posted such as: What is the birth rate among immigrant coolies in the F. M. S. and what the mortality among them amounts to? I mention these points merely to point out that we have a claim, and the landowners of the Madras Presidency have a claim, and last, but not least, the cooly has a claim that the Government should be called upon to protect the emigrant.

Proposed Labour Commission.—In common with other South Indian Planters I am much indebted to the members of the Committee that have issued their Report, but I confess to disagree with their arguments and conclusions, and record my criticisms under the idea that criticism will not only be welcomed by the actual members of the Committee but by the planters who are asked to give their opinions and the actual proprietors and Agents of Companies who are asked to subscribe to the scheme.

The Committee have set forth no less than 14 advertised Benefits that will accrue on general support being accorded to their Scheme. I find myself immediately at issue with them with regard to Number 1,

I am not altogether opposed to Labour Commissions, but am entirely opposed to a central commission on the score of both efficiency and cost. Those of us who have for some years taken interest in studying the Labour conditions will have noticed a curious fact. I trust Mr. Martin will bear me out. This is, that each district has more or less its own centres of recruiting. There are certain taluks of Trichinopoly where you will find practically every cooly is either an Up-country Ceylon cooly or an ex-cooly from the same districts. Similarly in South India the K. D. H. P. Coy. draw a very large percentage of their labour force (and certainly the best of it) from certain districts of Tinnevelley. Peermade, in the same way, has a recruiting zone from which the bulk of their best coolies are drawn. It is to these zones that these planting districts must look for the steady augmentation of their labour. If this is the case, it is practically only to the subdivision of the proposed Labour Commission that actually concerns them that planters must look for help. Then why have a Commissioner at all? It is an exceedingly expensive part of the scheme and in my opinion valueless,

2. The assurance could be equally well obtained by a commission appointed by the estates interested in one district and the agent would be under more direct control—a most important matter.

3 & 4. The same applies.

5. This would be of some use in new districts but as I have said it is to the old districts that planters must look for increasing their labour forces. If the planter does not know all about these he does not know his work

6. I agree with this but it is the planter who can best keep in touch by visiting his recruiting centres. My men do this and it pays, but it does not cost the estate a large sum annually.

7. Thank heaven I have nothing to do with this and sincerely hope I never shall.

8. A district Commission would do this as well or better.

9. I believe in this but a district can do this and advertise the beauties of their district without going into raptures about other districts.

10. I would personally not be prepared to pay money for this end, I would prefer to go and see for myself.

11. I believe these absences pay the estate as it is work that I do not think can be properly done by proxy.

12. I own this makes me laugh. I can foresee constant quarrels and complaints that one district is getting more for its money than another.

13, How? You cannot do away with competition. Is the Commission to tell me if I wish to try my luck in another district I cannot do so but am allowed to go, let us say, to Annantapur.

14. Now the rubber boom is over I foresee labour settling down a bit without help from a Commission.

My final conclusions are that a good deal might be done by each district running a small commission where labour demands it and there is sufficient co-operation in the district, but I entirely doubt the efficiency of a Commission as outlined by the Committee while I regard the cost as excessive.

I have one final suggestion to make although it does not bear absolutely on the labour question. This is: Has not the time arrived when it would be a good thing to form a series of strong committees of the U. P. A. S. I. representing tea, coffee, rubber and cardamoms, such committees to be elected by the interested concerns irrespective of districts. There are certain matters that concern all but these could be for the most part be discussed at the U. P. A. S I. The Tea, Coffee, Rubber and Cardamom Comittees would discuss only the matters that concerned them personally and should be able to do something towards standardizing rates etc., which cannot be done in a meeting where all products are represented. The deliberations of such produce committees would be circulated only to such members of the U. P. A. S. I. as are connected with the form of cultivation in question. Meetings could be held twice a year at such centres as are most convenient to the different committees.

I am, Sir.
Yours faithfully,
A. H. MEAD.

The Labour Problem.

The EDITOR,
Planters' Chronicle.

Sir,—I agree with every word "Kithogue" writes, "Legislation of any sort is futile." What we have got to do is to pay the cooly as much as he can earn elsewhere, in the Straits or Ceylon and land him on the Estate free of debt; and this we can do provided there is a reciprocity of warrants under Act I of 1903 between all Native States and Ceylon and British India, and that we are also allowed to enter into three years agreement with the cooly as done elsewhere.

What we want is no harbour for malicious, habitual and fradulent defaulters. We will then all be on the same footing and I think even a lesser wage in Southern India will then keep the cooly to our shores. Coolies generally hate going far away from their kith and kin, provided they can earn enough to keep them out of debt. Our promiscuous and huge advances have done most harm, and most of the coolies, including maistries, are so involved that they go beyond the seas or anywhere to get rid of or avoid the debt.

Every cooly and maistry knows that South India must and will give advances as asked for, for labour; and they also know they never need fulfil their obligations if they go to Ceylon or the Straits (where they are so easily helped to get to by Government). Stay away a year and the thing is done. They have learned this to such a nicety that the same game can be played with impunity between Cochin and Travancore (Native States) and British Territory, and all we ask is to be put on an equal footing with reference to Act I. of 1903, and a three years agreement. The latter point is particularly necessary, as the coolies debts can be divided by three, which we can then afford to write off if necessary, and they would be unburdened and receive their full wages,

ALISTER WEST.

TEA.

Tea in 1699.

Of all beverages, save perhaps wine, tea has probably been subjected to the greatest variety of criticism from the highest praise to the strongest condemnation, and numbers of books, pamphlets and verses have been written for and also against its use.

In a book written in 1725 and quoted in these columns some little while ago, there was ascribed to tea most of the diseases then known, but this was, perhaps, an extreme case, and there were, even in those days, many more eulogistic writings than the reverse.

In 1699 there was published in London "An Essay upon the Nature and Qualities of Tea," by J. Ovington, M. A., Chaplain to His Majesty. According to the title page, it shows: I. The Soil and Climate where it grows. II. The various kinds of it. III. The Rules for Chusing what is best. IV. The Means of Preserving it. V. The several Virtues for which it is fam'd.

The dedication is to the Right Honourable the Countess of Grantham, and as was not unusual in those days, is couched in somewhat extravagant phraseology. It commences:—

"Madam,—'Tis from Your innate goodness only, and that condescending Temper which is so remarkable in You, that this Foreign Leaf dares presume to court Your Favour, and hope for a welcome Entertainment,"

After further laudatory remarks about this most exemplary Countess, the writer, referring to Tea, goes on to say:—

"It is generally acknowledg'd to be both Pleasant and Medicinal, at once to delight the Palate and correct the Disease, and to heal the Distemper without giving any Disturbance to the Stomach.

"And certainly were the Custom of Drinking it as Universal here, as it is in the Eastern Countries, we should quickly find that Men might be chearful with Sobriety, and witty without the Danger of losing their Senses; and that they might even double the Days of their natural Life, by converting it all into Enjoyment, exempt from several painful and acute Diseases, occasion'd very often by a pernicious Excess of inflaming Liquors, which render it rather a Burthen, than a Blessing to us."

The worthy Chaplain had, it seems, unbounded faith in tea, and we can only hope that the obvious inference that the people in the times of William III, spent half their days afflicted by disease very often occasioned by indulgence in alcohol is somewhat exaggerated.

The Essay opens by stating that tea has for many years been highly approved in China and Japan, and that Europeans by their "frequent Navigations" have recently become better acquainted with its "Vertues," and have encouraged the importation of it. "And since the Drinking of it has of late obtain'd here so universally, as to be affected both by the *Scholar* and the *Tradesman*, to become both a private *Regale* at *Court*, and to be made use of in places of *publick Entertainment* which has greatly rais'd the character, and gain'd it a singular Repute; it might not be amiss therefore to draw up a short Account of its *Nature* and *Qualities* to satisfy such as are its curious Admirers with the Knowledge of its Use," After a description of the tree and comments on its hardiness which enables it to thrive in climates, "the sharpness of whose Air might seem pernicious" if not fatal to its tender Leaf," the writer suggests that it might be grown here. "And might it, therefore, be convenient to have it brought hither, there is nothing in the Nature either of our Ground or Air that seem to contradict its Increase among us; Especially if sufficient Care were taken for the safe and cautious Transportation of the Seeds or Branches, and in their Growth they were expos'd, with the best Advantage to the Sun. Though the Art here used for raising of it has not yet answer'd Expectation. But whether this proceeds from the *Envy* of the *Chinese*, who are said to boil the Seed, lest it should be planted anywhere else; or from the Age of it, or untimely Collection of it, or the immoderate Heat of the Sun, and variety of Weathers in a long Voyage, it's uncertain."

Here is apparently an industry ignored by the agriculturists of this country. Imagine the production of nearly three hundred million pounds of tea for home use only. to say nothing of the export trade that might ensue. Possibly we should lack fresh milk to drink with it, but it may be that part of the learned Prelate's scheme was to start the dairying industry in the countries of indigenous tea.

The author states that while there are many sorts of tea in China, that which is brought into Europe is known only by three distinct names. "The first Sort is *Bohe*, or as the *Chinese* have it, *Voui*, which is a *little Leaf inclining to black*, and generally tinges the water brown, or of a reddish colour. Those in *China* that are *sick*, or are very careful of preserving their Health, if they are weak, confine themselves only to this kind of *Tea*, to which they are willing to ascribe a peculiar Virtue both for *healing* and *preventing* a Disease; and extol it as a mighty Friend to Nature when it is grown faint and languishing. The Taste of it, when it is very true and genuine, is delicious and pleasant, and the weakest Stomach is able to bear it. This kind of *Tea* therefore is, both in Colour and Nature different from the other two, and very useful to such as are *wasting* and *consumptive*. and excels the others in its healing balsamick Quality, and particularly in improving by *Length of Time*, which is very pernicious to the rest, for it generally grows better the longer it is kept.

"The second Sort is *Singlo* or *Soumlo* with the Chinese; of which there are several kinds, according to the place of *Growth* the manner of *preparing* it, and the *Nature* of the *Tea*. But that which is imported hither is of two sorts, both equally good. One of them is a *narrow and long leaf*. The other *Smaller* and of *blewish green Colour*, which tastes very crisp when it is chaw'd and afterwards looks green upon the Hand, and infuses a pale greenness into the Water. The Flavor of it is fresh and fine, lively and pleasant. 'Tis strong, and will endure the Change of Water three or four times. This *Tea* is brought over in round Totaneg *Canisters* pasted over with Paper, and inclos'd in a wooden Tub, containing the quantity of half a *Pecul*. And that you may more plainly discern whether all of it be new or no, these two things may be observ'd *First*, Examine the Leaves to see whether all or most of them are green; if not, but that some of them are turn'd brown, or look *decay'd* then may you guess that the *Tea* is not the finest, but is growing old, and will impair in Virtue daily, *Secondly*, Let the Liquor, into which the *Tea* has been infus'd stand in a Cup for the space of a whole Night; if after this you perceive that it still continues green, the Goodness of it seems unquestionable; but as it abates of its Perfection, and wants something of its Excellence and Strength. For the *fragrant Smell the green Colour* and the *bitterish sweet Taste*, are the distinguishing Characters of the Goodness of this kind of *Tea*.

"The third sort is *Bing* or *Imperial Tea* according to the Epithet given it by the *English*, and by the *Dutch*, *Keisar*. This is a *large loose Leaf*, and therefore takes up more Room, proportionable to the weight of it, than any other *Tea*, because it is more open and spongy. The finest Sort of it looks both green to the Eye, and is crisp in the Mouth, and the Smell of it is very pleasant, which inhances the Price of it here in ***England*** ; and 'tis highly esteem'd likewise in *China*, being sold there at three times the Price of the other two. But it generally is of divers Colours, as yellow, green, &c., and is reputed weak, spending itself quickly in the Infusion, and only tinctures the Waters with any Spirit twice, because it is not puting weight for weight with other *Tea*. This likewise, as the others, is Imported in large thick Totaneg *Canisters*, included in wooden Tubs, or in Baskets made of mall *Bamboo Canes*.

After this comes a warning against the cupidity of the Chinese, who are, it is stated, " So mightily intent upon their *Gain*, that they falsify every thing they sell, if 'tis capable of *Sophistication*." Like Bret Harte the author seems to have become acquainted with some of the black sheep, for he goes on to say that " such is the peculiar Talent of the *Chinese* in the Management of this Art, that the Discovery of them in one Trick, is only the quickening their Invention of another."—*The Produce Markets Review*.

(*To be continued*)

COFFEE.

A rather sensational report from Santos that the drought has had a serious effect caused a sharp advance for a short time, until it was realised that only the very earliest crops could be affected, for the general flowering is not until September and October. The next day is was cabled that rain had fallen, and the result has been a decline of about 6*d*. per cwt. At this season there are nearly always these conflicting rumours, but they are so often contradicted directly afterwards that very little confidence is placed in them. The trade demand has been fairly good, both the Continent and America having bought largely at prices considerably below those of a year ago. The Brazilian receipts have been heavy, and consequently the Santos stock has rather accumulated, but not to any serious extent, considering the present facilities for financing the Coffee which did not exist a few years ago. Columbian is the principal kind that has been offered here, and it has sold very freely at a further advance of 1*s*. to 2*s*. per cwt. Reports speak of a very large crop, but this kind is in such demand that, with a shortage in some other growths, there will be little difficulty in disposing of it.

LONDON COFFEE RETURNS.

—	*Home Consumption.		Export.		Stock.	
	1913.	1912.	1913.	1912.	1913.	1912.
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
For week ended August 16th ...	256	274	600	191	15,935	13,617
For 33 weeks ended August 16th ...	9,908	10957	12,183	10,191	—	—

*The Home amount contains a proportion for Export delivered by cart.—***The Produce Markets Review.***

The Planters' Chronicle.

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THE U. P. A. S. I.

(INCORPORATED.)

Contents.

Mr. Anstead, Scientific Officer, has been away in Coorg during the past week, but hopes to return to Head Quarters on the 6th instant, but left for publication an article on the Red Spider which does so much damage to Tea. The remedy should be closely read.

A short account of the process for improving the lower grades of Rubber is published for the information of Rubber Planters.

Two District Planters' Associations meetings are published—those of the Wynaad and Nilgiri Planters' Associations. We regret that pressure of space prevents us publishing the whole of the proceedings of the latter Association, but we may mention that a Resolution was passed identical with that passed by the Wynaad Planters' Association, on the proposed Labour Commission.

Correspondence takes up a large portion of this issue, and as it deals largely with the Labour Problem and the Labour Commission, we think that at this juncture the Labour Question is so prominently before the Planting Community, it is advisable to publish as much as possible that has any bearing on this important subject. On both these subjects, we are glad to publish two letters from Mr Barnard, which, though they may not find ready acceptance, are welcome as showing that men are ***thinking*** and trying to find a solution of this subject, and may have the effect of stirring others up to write for the benefit of all of us.

From C. J. H's letter it appears that men are beginning to realise that safety is to be found in the establishment of a Labour Commission.

Above the signature of H. T. K. we publish a criticism on the Labour Commission's report, but we cannot help thinking that these criticisms would carry more weight if correspondents would sign their names to them rather than hide their identity under a nom-de-plume or initials.

The Secretary wishes it to be known that he is publishing in a pamphlet form the whole discussion on the Labour Question that took place at the Annual Meeting in August and that applications should at once be sent in for them.

Scientific Officer's Papers.

CXXIII.—RED SPIDER (*Tetranychus bimaculatus*),

Red Spider is a minute reddish mite which attacks a large number of plants including Tea. Seasons of excessive drought are favourable to the development of the mite and at such times the pest increases rapidly. The leaves of plants infested with Red Spider often turn deep red or rusty on their upper surface and hence the pest is sometimes popularly called a 'rust,' but if such leaves are examined on their under surface they will reveal the presence of the Mites and the inconspicuous webs behind which they are feeding and laying their eggs.

The typical female is 0'5 mm long by 0'26 mm wide, broad oval, widest in front and the legs are shorter than the body. Its colour is usually brick red. The typical male is 0'27 mm long by 0'15 mm wide. The eggs are minute, and perfectly round. The larvae hatching from the eggs are almost round, have six legs and are nearly colourless. They grow rapidly and moult twice, at the first moult an extra pair of legs being added. The old last skins are usually seen in abundance as white specks on the under side of attacked leaves.

The influence of weather on breeding activity is very marked. Hot, dry conditions favour and hasten development and, cold wet weather retard it.

The Red Spider is known to attack a large number of plants. An American Bulletin lists 104 known food plants and these include many common garden plants like Violets, Sweet Peas, and Salvia, as well as plants of economic importance like Eggplants and Tomatos and a number of common weeds.

Recently the leaves of a young crop on an estate near Bangalore were found to be badly damaged by a Mite very similar in appearance to Red Spider. Specimens were sent to the Government Entomologist who identified them as belonging to the "Red Spider" group of Mites, but he was unable to say whether they were specifically identical with *Tetranychus bimaculatus* or not as no one has ever done any work on Indian Mites. He thought they were more probably a species commonly found on Cholam (Juar. Jola, *Andropogon sorghum*) which turn the leaves red.

Red Spider is carried from plant to plant by wind and by the agency of domestic animals, insects, and birds, but mainly by its own efforts. They spread from plant to plant along interlacing branches and along the ground.

They have a number of insect enemies which no doubt help to keep this pest in control. In the case mentioned above a number of small beetles were present running about the infected leaves and under the webs of the Mites. These were identified by the Government Entomologist as a species of *Scymnus*, a Lady-bird Beetle, and he remarks, that as far as his observations on Cholam go, these Lady-birds, both larvae and adults, only eat the eggs of the Mite but each gets through a large quantity and does a lot of good.

With regard to the use of Sprays it is absolutely necessary to use a contact Insecticide, and as the mite passes most of its existence on the underside of the leaf it is necessary when spraying to hit the underside of every leaf on the plant with the spray. This means careful spraying and it is further necessary to spray twice as no insecticide is known which will kill the eggs. The second spraying is to kill the Mites which have hatched from the eggs untouched by the first spraying.

The best spray to use appears to be either Flour Paste by itself or Flour Paste and Sulphur.

The following method of preparing the flour paste is given in American Bulletins on the subject. "Mix a cheap grade of wheat flour with cold water, making a thin batter, without lumps, or wash the flour through a wire screen with a stream of cold water. Dilute until there is one pound of flour in each gallon of the mixture. Cook until a paste is formed, stirring constantly to prevent caking or burning. Add sufficient water to make up for evaporation."

Eight gallons of this stock solution are diluted to 100 gallons of water and used as a spray, and this alone is said to be very effective against the Mite. It is usual however to add to this 100 gallons 15 to 20 lbs. of flowers of sulphur and use this mixture as a spray. The Government Entomologist points out that this sulphur paste spray must be put on early in the morning as the decomposition of the sulphur under the action of Sunlight is the active principle.

RUDOLPH D. ANSTEAD,
Planting Expert.

Rubber: Process for improving the lower grades of—The Diamond Rubber Co., Fr. Pat. 448, 974, August 12, 1912.

Lower grades of rubber are improved in quality by treatment with the alkali metals or their alkaline derivatives. For example: (1) 100 parts of low-grade rubber, containing 6 per cent. of acetone-soluble impurities are mixed on the masticating rolls with sodium, 5 parts, the rolls being maintained at a temperature of 60° —76° C. In a few minutes the mass begins to harden and is transformed into a very tough product resembling high-grade rubber, which does not stick to the rolls and can be manipulated with ease When the sodium is sufficiently distributed throughout the mass it is put aside to "incubate" for 24 hours in a suitable receptacle at a temperature of about 60 °C. The metal is then removed by appropriate treatment. (2) 100 parts of "tacky" Pontianac rubber, containing 20 per cent. of acetone-soluble products, a e mixed on hot rolls with sodium hydroxide (fused and powdered) 8½ parts. The mass is rapidly transformed into a tough product of superior quality, which is easy to manipulate. The transformation is completed by "incubating" (as above) at about 60° C. for 48 hours, after which the alkali is removed by washing or other suitable means. (3) 100 parts of low-grade, tacky rubber are dissolved in 750 parts of xylene and heated with sodium, 5 parts, at 100° C. in an autoclave for 24 hours, the mass being well agitated in order to distribute the sodium. The product is a gelatinous mass from which the solvent and alkali can be removed by suitable means, and which yields under this treatment a tough elastic substance of superior quality. In the case of rubber containing high percentages of resins, it is desirable to remove the resins from the rubber before treatment. The products obtained by this process are much less soluble in the ordinary solvents than the parent substances. They vulcanise readily, yielding products of increased value.—E. W. L.—*Journal of the Society of Chemical Industry.*

DISTRICT PLANTERS' ASSOCIATIONS.

Wynaad Planters' Association.

Proceedings of a Meeting held at the Meppadi Club on September 17th, 1913.

PRESENT.—Messrs. Bownass, Darkin, Davies, Macbain, Malcolm, Milton, Parker, Powell, Vernede, West, Whitton, Winterbotham, C. E. Abbott (Honorary Secretary). *By proxy*: Mr. J. C. Stewart. *Visitor*: Mr. Blackham. Mr. Malcolm in the Chair.

1851. *The proceedings of last meeting* were confirmed.

1852. *Election of New Members.*—Messrs. N. C. Whitton and H. C. Davies were elected members.

1853. *District Board.*—Dr. Milton has been appointed to succeed Mr. J. Carson Parker as the Representative of the Association on the Malabar District Board.

1854. *Postal Delays.*—Read letter from the Honorary Secretary to the Postmaster-General giving instances of delay; and reply stating that the matter is receiving attention. Mr. West gave further instances and also complained of the delay in the post between Cherambadi and Sultan's Battery. The Honorary Secretary to address the Superintendent of Post Offices, Calicut.

1855. *Telegraph Office at Sultan's Battery.*—Read correspondence ending with the letter of the Superintendent of Telegraphs, West Coast Division, dated July 30th, stating that the matter is before Government, since when nothing has been heard. The Honorary Secretary was asked to write again.

1856. *Post Office at Vellera Mulla.*—Read correspondence about the proposed removal of the office to Pootoo Mulla Estate. (Since the Meeting a letter has been received from the Superintendent of Post Offices suggesting putting the office on Chenal Mulla Estate).

1857. *U. P. A. S. I. Meeting.*—Mr. Bownass, the Wynaad Delegate, read the following Report:—

"Mr. Chairman and Gentlemen,—You have no doubt read reports of the Conference in the *Madras Mail* and other papers, but they were, I am sorry to say, neither very good nor very accurate. You have had, however, your *Planters' Chronicle* and the Chairman's, Planting Member's and Scientific Officer's eloquent addresses are there reported in full. These and the settling of the order of business took up the first day.

"There was nothing of any very special interest to our Association beyond the question of labour and the non-service of warrants. With regard to the Labour Question, which was quite the most important question before the meeting, you have all had the printed report of the Labour Committee, and have no doubt read it. This question was felt by all to be vital, and was given a whole day to itself. One cannot help feeling that it would be a good thing if all planters could attend these conferences, as it is a difficult matter afterwards, to put down or represent anything like the interesting discussions that take place, and the divergence of views expressed by the delegates from the different districts. All the delegates however were unanimous upon the point of Labour. It was considered that the U. P. A. S. I. had shelved this question in the past, but that now or never something must be settled. The proposal to start a Labour Commission of our own, on similar lines to those of other countries, was unanimously adopted. As it was thought useless to discuss the question further, until some working scheme was formulated, the meeting appointed a Sub-Committee to draw up a Scheme and present the same to them for approval, and did me the honour of appointing me as one of the Committee. The Committee's report was read at the Meeting on a subsequent day, and met with general approval. Gentlemen, I should strongly advise you to buy the Book of Proceedings, from which you will get a full report of the speeches made, and the interesting nature of the discussion which took place thereon.

" We tried to set forth the 'reasons' and the 'benefits' to be gained by the establishment of such a Commission as fully and lucidly as possible, in order that Directors and Agents might grasp our point of view, and recognise that this question is one of paramount importance to the planting community of Southern India. While upon this question I may mention that a resolution was passed requesting Government to suppress the Professional Recruiter, who was defined as follows :—

" The Professional Recruiter is an individual who collects coolies and sells them at any centre and afterwards ceases to have any further interest in their well-being, future, or whereabouts, as distinguished from the authorised Kangany or Maistry," and this is a step in the right direction.

" With regard to the question of the non-service of warrants, the question that you particularly asked me to bring up, a resolution was unanimously passed as follows :—'That this Association would call the attention of the Government of Madras to the fact, that in spite of previous representation made upon this subject the number of warrants taken out against absconding maistries and coolies, which are unexecuted, remains very large, and particularly in the Native States of Mysore and district of Coimbatore, and would ask them to urge upon the officials of these respective districts that greater efforts be made to effect the service of warrants generally, and further, that we bring to the notice of the Mysore Durbar the fact that the local courts having jurisdiction are treating non-bailable warrants as bailable warrants resulting in the escape of the accused," but I might say that other delegates suggested that we might have requested the assistance of the Resident and Dewan, and this I leave for discussion at this meeting.

" I would bring to your notice the questions of support of the London School of Tropical Medicine, and the Planters' Benevolent Fund. The former is, I think, worthy of our support as an Association, and I would ask you to consider the question of contributing towards it. The latter you all know is a most desirable institution which does not get its proper measure of support by planters generally. I refer you, however, to the remarks upon this fund made by the Chairman in his opening address.

" It was unanimously agreed that the appointment of the Scientific Officer should be continued for another period.

" Gentlemen, I shall be glad to answer any question whatever upon the proposed Labour Commission scheme provided it is in my power to do so.

" Finally, I think that we have to congratulate our worthy Secretary, Mr. Abbott, upon holding the Chairmanship during two consecutive years, and in all, I believe, three times, and for piloting so ably the U. P. A. S. I. ship through a time of much worry and trouble," The Repors was ordered to be printed.

The Chairman, Mr. Malcolm, expressed the thanks of the Association to Mr. Bownass for his work, which was heartily endorsed by the Meeting.

1858. *Proposed Labour Commission.*—Mr. Malcolm spoke as follows:—

"We have all heard Mr. Bownass' Report with interest, and I think I am expressing your views in saying that we should accord him a very hearty vote of thanks for all he has done on our behalf at Bangalore. I think, too, that you all agree that the meeting identifies itself with what he has said about Mr. Abbott.

"The most important matter referred to in the report is that of Labour. It is not only a very important matter affecting us as a District, but, we understand, is equally important to the other planting districts of S. India. It is one that requires our very serious consideration.

"With the keen competition we are now experiencing with Ceylon and the F. M. S., it would seem that the only way of protecting our industry is to have a similar organization to theirs, to protect the interests of the estates we are responsible for, and to combat the competition we are meeting with from them.

"I hope you all agree that we approve of the idea of having a Labour Commission. The only matter that seems to me to call for very careful consideration, is the question of cost. I do not say this with the object of raising an objection, but in the hope that it will lead to discussion and very careful consideration of the point. I understand that in Ceylon the cost of their Labour Commission is somewhere about 33 cents (say 5 annas) per acre, whereas we may be called on to pay as much as Rs. 2 per acre. However the position, owing to the competition mentioned, is becoming such that some drastic action on our part is necessary to meet the case.

"I would suggest that if you are unanimous on the matter we should pass a resolution expressing our view, and should refer the matter to our respective Boards of Directors, or Proprietors, as soon as possible.

"Before concluding I think we should confirm the appreciation that has already been expressed at the U. P. A. S. I. meeting, of the work done by the Labour Committee. Our thanks are due to them for their trouble and Labour in drawing up the concise and able report on the position."

The subject was fully discussed, various questions were replied to by Mr. Bownass, and further explanations were given.

The following resolution was put from the Chair and carried unanimously:—

"This this Meeting is unanimous in considering that the institution of a Labour Commission for South India is an urgent necessity, and that the Members present agree to represent the position to their Proprietors, recommending them to allow the Estates they are in charge of to join the scheme if it is found that the promises of support justify the establishment of a Commission on the lines suggested in the report of the Committee appointed by the United Planters' Association of Southern India. Proposed from the Chair, and carried unanimously."

Regarding a suggestion made by the Hon'ble Mr. E. F. Barber, it was decided to ask Members to send the Honorary Secretary the percentage of coolies they employ locally, or recruited from each District.

It should be explained that this enquiry is made to enable the Executive Committee of the Labour Commission to decide where Assistant Commissioners ought to be stationed. There is no necessity to give Maistries names. All that is wanted is a statement "——Estate employs——% Local Coolies——% Canarese——% Coimbatore, etc."

1859. *Non-Service of warrants in Mysore.*—With reference to the discussion on this subject at the July Meeting of this Association. and at the U. P. A. S I. Meeting, the Honorary Secretary was instructed to address the Hon'ble the Resident.

1860. *Extradition.*—The Honorary Secretary was instructed to address the Chief Secretary to the Madras Government and ask if it would be possible to grant Extradition of absconding Maistries and coolies from Cochin and Travancore under Act I of 1903.

1861. *Grant to Meppadi Club.*—The consideration of this was postponed.

1862. *School of Tropical Medicine.*—The question of a grant from the funds of the Association was postponed till next Meeting.

The Proceedings concluded with a vote of thanks to the Chair.

B. MALCOLM,
Chairman.

C. E. ABBOTT,
Hony. Secretary.

Nilgiri Planters' Association.

At a meeting of the Nilgiri Planters' Association held at the Collector's office, on Saturday, with the Hon'ble Mr. E. F. Barber in the chair, the following members were present: Mr. J. S. Nicolls, (Honorary Secretary,) Mr. J. Harding Pascoe, Mr. A. S. Dandison. Mr. W. A. Cherry, Mr. Sydenham Clarke, Mr. W. Deane. Mr. C. Gray, Mr. P. Beaver, Mr. R N. C. Grove, Mr. S. Bayly, Mr. W. Rowson, Mr. F. M. Cockburn, Mr. G. W. Church, Mr. Fulcher, Mr. L. A. Gerard Rogers and Mr. A. A. Brown.

By Proxy.—Mr. A. G. Nicholson, Mr. DeCourcey, and Mr. B. Von Dulong.

The following visitors were also present:—

Mr. Leslie Rogers, Mr. Murphy, Mr. D. Elkington, Mr. M. Young, I.C.S., Mr. H. C. Golden, Mr. N. J. Stanes, Mr. E. Vernede and Mr. Bisset.

Proceedings of Last Meeting.—These were taken as read.

U. P. A. S. I. CIRCULARS.—The following circular from the U. P. A. S. I. was read by the Honorary Secretary:—

"Dear Sir,—The following letter has been addressed to me by the Planting Member, and I shall feel very much obliged if you will give the matter your earnest and immediate attention.

"CINCHONA.—Government wish to know how many lbs. of bark can be supplied annually by planters during the next 5 years. I shall be glad if you can get me the information through the Honorary Secretaries of the District Planters' Associations.

" RATES OF PAY.—The Hon'ble Sir Harold Stuart wishes to find out the ruling rates of pay for coolies in various districts and the cost of living. Ruling rates of pay does not mean the average rates. Where rates vary in one district, the variations should be given, and whére payments are made on results, the minimum and maximum monthly earnings should be shown.

" For instance, women might be shown to earn from so much to so much in the worst plucking month and so much to so much in the best plucking month. The enquiry of Sir Harold's is not official and, all the more for that reason, I should like the information to be prompt and exact.

" I trust that you will let me have a reply as early as possible, giving full and accurate information on the lines laid down in the Planting Member's letter."

The Honorary Secretary requested members to let him have the information asked for as early as possible, in order that he may reply to the circular. In response to some questions from members, Mr. Harding Pascoe thought the submission of such information would serve a useful purpose as there seemed to be a feeling that the cooly man was very badly treated and such information would tend to show the real state of affairs.

Mr. Barber pointed out that the information was not officially required and that possibly it would be of assistance if the district was divided into three divisions for the purposes of calculating wages. The information as regards cinchona bark was also promised.

ROADS AND COMMUNICATIONS.—The next subject was with reference to the Nadgani and Gudalur-Vytiri Road, which had been in a most unsatisfactory condition. A letter was read from the District Board stating that ample funds had been allotted, and the Hon'ble Mr. Barber stated that he had noticed much improvement already on this road. The meeting recorded the papers with satisfaction.

PREVENTION OF COFFEE THEFT.—With reference to a letter from the District Superintendent of Police asking what date was best for starting the duty of police for the prevention of coffee thefts, members thought it should start about the middle of October. It was resolved that members should communicate direct with the Superintendent of Police.

" U. P. A. S. I. DELEGATES' REPORT.—Mr. Nicolls read the following Delegates' Report which was recorded with a very hearty vote of thanks, proposed by Mr. Cockburn and seconded by Mr. Sydenham Clarke: -

" GENTLEMEN,—As your Delegates, we attended the annual meeting of the United Planters' Association of Southern India, held in the Mayo Hall, Bangalore, from the 25th to 29th August, 1915. You will have read in the daily papers the Secretary's annual report, the Chairman's address, the work of the Planting Member and the Scientific Officer's annual report. They were all full of interest, showing what energy and keenness those concerned have put into their labours for the furthering of your interests, opening up many lines of thought, both as regards scientific researches and matters of even more vital importance. Lines which to the casual reader of the newspaper, we may appear to have rushed along too quickly, heedless of any dangers in front of us. Buy and read the annual book of proceedings, then we feel certain you will not think the confidence put in your Delegates has been misplaced. We will now remark on the items as they come in the agenda :—

(*To be continued.*)

CORRESPONDENCE

Munderi Estate,
Pundalur P. O., 24th September, 1913.

The EDITOR,
Planters' Chronicle,
Bangalore.

The Labour Problem.

Dear Sir,—Observing that my letter has elicited some comment by "Wanderer" I venture to address you further in connexion with one point.

It is: The appointment of Travelling Assistant Secretaries. "Wanderer" objects on the score of expense and states men "well up in coffee, tea, &c., would be required on a big salary."

I cannot agree with him for the following reasons: –

(1) The duties of the Assistant Secretary would be to collect and distribute opinions and in matters of general interest attempt to reconcile them. Personal intercourse will accomplish more in a month than correspondence will in a year. Regarding the technical and scientific aspects the A. S. would not be required to give a definite opinion matters brought to his notice. We have a Planting Expert and assistants and hope to have a Mycologist to whom such matters would be referred by the A. S. on his periodical visits to Headquarters.

Further, though it is a minor point but not without value, as "Wanderer" says. "We gaily agree to carry out 'experiments—but the results are nil." Now none of us care to admit failure but the sense of regret is very much lessened when the admission is made through the post or not at all, but if a man after promising to perform an experiment was conscious that someone would personally come round and collect results in due course, I fancy a great many more experiments would be carried to a successful conclusion. Generally speaking it is beyond dispute that personal intercourse is the most satisfactory method of conducting business and in my experience I have observed that most Associations, Trades Unions, &c., have travelling officials and since they find the appointments justified it will require convincing arguments to prove the contrary in our case.

For these reasons I think that a couple ot Travelling Assistant Secretaries on say Rs.400 a month plus Rs.100 travelling allowance would be a decided advantage to the community.

There is one line of argument I foresee and it is :

1. Can we afford it ?
2. Will the results justify the expenditure.

Regarding 1. I see from the Labour Committee's Report that the subscribing acreage to the U. P. A. S. I. is 140,000 acres, but taking 100,000 as the acreage which with an *annual* cess of 2 annas per acre will yield Rs.12,500 per annum, quite enough to support 2 men.

A salary of Rs.400 should, I think, attract the right sort of man who would be just an ordinary planter with a working knowledge of planting and *some tact*.

The second possible objection is one that scarcely admits of argument. Those in favour of the idea have behind them the fact that it has proved a success with other organisations while for those against it—well I don't propose to provide them with arguments even if I could think of any valid ones.

In conclusion I must apologise for inflicting this lengthy letter on you, but excuse myself on the score of complying with your request for communications from planters and subscribers to the *Chronicle*.

Yours faithfully,
N. O. S. BARNARD.

Munderi Estate,
Pundalur P. O., 24th September, 1913.

THE EDITOR,
Planters' Chronicle,
Bangalore.

Labour Commission.

Dear Sir,—I have read the Report of the Labour Committee which, while most interesting, is not very definite on one important point.

From the general tenor of the Report one gathers that the expenses of the Commission are to be divided between the various District Associations in proportion to their subscribing acreage, the inference being that the Commission is to be worked at a loss in the sense that the establishment and other expenses will not be met by an income derived from charges to be levied on estates for labour supplied but will in the first instance be met from the Rs. 2 cess and subsequently divided *pro rata* amongst the District Associations.

If this view of the financial aspect of the Labour Commission is correct then I venture to say it is susceptible of improvement.

In any undertaking in which there is no immediate check on expenditure in the form of a monetary income there is a decided tendency for the expenditure to increase in undue proportion to the benefits obtained and with all due respect to the Labour Commissioner, whoever he may be, I am sure he will not be able to say, at any rate for some considerable time, how far the results he obtains justify the expenditure.

A very simple remedy to my mind is to form the Labour Commission into a Limited Liability Company with a capital of say 3 lakhs of Rupees in Ten Rupee shares. Of this capital Rs.5 per share could be called up now which is roughly equivalent to the Rs.2 cess or better still half the share capital 1½ lakhs could be issued in the names of the various District Associations in their due proportions and the remainder offered for public subscription. This would give managers and superintendents who believe in the scheme an opportunity of backing it with more than words and also remove the at present reasonable argument of Estate Proprietors that managers and superintendents can afford these experiments as they risk other people's money and not their own.

The Board of Directors would of course consist of the President and Secretary of the U. P. A. S. I. with the Presidents of the District Associations and the Labour Commissioner as Managing Director.

There are many methods of levying charges but a simple one would be a system on the following basis:

1. The Company to charge a sliding scale percentage on the advance granted to a Maistry or Kangany for supervising his recruitments. This amount which on *each individual advance* would be trifling the Estate Manager could debit to the maistry.

2. The Company to charge another sliding scale percentage on monthly cooly earnings of each maistry which amount would be debited to the Estate.

The sliding scales would decrease as the amount of advance increased in the 1st case and the longer the cooly stayed on the Estate in the 2nd. I have very roughly sketched the idea and the charges would have to be very carefully framed but I am sure they would be insignificant compared with the annual loss on bad advances and further the profits, for there should undoubtedly be profits, distributed amongst the shareholders would mean so much off the commissions paid to the Company.

Yours faithfully,

N. O. S. BARNARD.

The EDITOR,
Planters' Chronicle,
Bangalore.

Labour Commission.

Sir,—At our Association Meeting held recently to discuss the Labour Commission Scheme, the question was asked if there was a likehood of the various Planting Districts having certain labour recruiting areas allotted to them, we were informed that it was not possible, that it was a selfish idea and I understood that if the question was even asked at the forthcoming Extraordinary General Meeting of the U. P. A. it would cause tremendous friction at the start. I fail to see this, from my slight knowledge and what Mr. Mead writes in his letter to the *Chronicle* of 27th instant it appears that most districts have more or less their own recruiting centres, if such is the case, it appears to me that it would help the Labour Commission immensely and prevent friction as far as possible the allotment of recruiting areas was agreed upon.

C. J. H.

A Criticism.

A criticism on the U. P. A. S. I's Labour Committee's Report as regard " Benefits to be derived form the establishment of a Labour Commission."

(I) Is it likely that this Labour Commission will be able to persuade any foreign Labour Commission to do anything which would curtail their supply of labour? The Labour Committee point out " that whereas in practice we can advance a cooly for not more than one year's service Foreign Countries can advance for three, and consequently have the great advantage over us of being able to make much larger advances," but they do not say how they propose to get over this difficulty. There are at least 3 ways of putting us on the same footing as foreign countries in this matter, *viz*:—

(*a*) by limiting the amount of advance to the same for all.
(*b*) by allowing us to advance for 3 years service.
(*c*) by not allowing anyone to advance for more than one year.

If Government can be induced to legalise either (*a*) or (*c*) it is probable we should get all the labour we require without such an expensive Labour Commission. It is the big lump sum down which tempts the cooly to emigrate and that is what we do not care to risk advancing because of the facilities our labour has of evading repayment. It is the big advance we shy at and not the high pay. At any rate why not get Government to consider the matter before plunging into the cost of an expensive Labour Commission.

(2) How will the Labour Commission ensure this more than the law does at present, unless they can identify coolies or alter the law ?

(3) Does the Labour Commission propose to prosecute defaulters ?

(4) Does the Labour Commission propose then to supply new labour for short periods ?

(7) This can be done without a Labour Commission as hitherto.

(8) From this it is to be assumed that the Labour Commission propose to keep some sort of registration, but would they be able to identify a maistry taking advance in Coimbatore when he had already taken one in Trichinopoly or do they propose to have only a central depôt and if so who is to pay the railage, etc., of maistries going to be registered ? Also what is to prevent a maistry from taking an advance from the Labour Commission and then going to a foreign country as do now ? Could even a central depôt identify men ?

(9) Would advertising be of any use when coolies know that foreign Labour Commissions will advance far more.

(10) A temporary advantage gained until foreign Labour Commission Agents learn of the new recruiting areas.

(13) Inter-district competition can be stopped by agreement and published in the *Planters' Chronicle.*

(14) Vide para. 8 above.

Summary :—The whole matter seems to turn on whether the U.P.A.S I. (not a Labour Commission) can get us put on even terms, as regards advances, with our competitors, if so a labour Commission may be able to give us the benefits they claim will accrue, excluding the identification of maistries or labour. It is noticeable that the Labour Commission say nothing about the prevention of crimping—and perhaps it is just as well—for even presuming that all planters undertake not to employ any labour (except locals) without a chit from the Labour Commission, now would it be possible to prevent the same cooly from being sent out under different (or even the same) maistries several times in the year if there is no identification. So long as our competitors can advance more than we care to risk, the Labour Commission will not do any more (at great cost) than we are now doing for ourselves (for comparatively little) except possibly to give us the benefits claimed in paras. 4. 6, 10, 11, and 12.

N. I. K.

THE MANAGING EDITOR, Coonoor, 22nd September, 1913.
Planters' Chronicle,
Bangalore.

Coffee Borer.

Dear Sir,—For the past two years I have been scraping the stems of the trees and coating thickly with good whitewash, preferably from shell lime which must be fresh. A woman will scrape 50 trees or whitewash 50 trees. I have found this a safe remedy and am now trying simply whitewashing without scraping.

Yours faithfully,
A. G. NICHOLSON.

The Planters' Chronicle.

RECOGNISED AS THE OFFICIAL ORGAN OF THE U. P. A. S. I., INCORPORATED.

(Secretary's Registered Telegraphic Address "Planting," Bangalore.)

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THE U. P. A. S. I.

(INCORPORATED.)

Contents.

This week a rather larger issue of the Chronicle is published due to the publication of three proceedings of three District Associations, which contain matter of general interest.

The Nilgiri Planters' Association Meeting is concluded from last week's issue. North Mysore and the Shevaroys contain matter of rather more than local interest.

As was to be expected the proposed Labour Commission is very much to the front, and its Proposal will be read with attention by all the Planting Community. No doubt as soon as all the District Associations have expressed an opinion on the proposal, the Executive Committee, or some member of that body, will publish an authoritative scheme, which will give time for everyone to digest before the Extraordinary General Meeting is held. It is evident from the time of some of the speeches that have appeared that some such authorised scheme is expected by the planting community, as to the working of the proposed Labour Commission. The matter is far too important, in our opinion to be hurried or rushed.

A large amount of correspondence on the Labour Commission and Labour Problem is published, which shows that the matter is receiving general attention, and we consider Mr. Danvers' appeal is very appropriate at this moment, but we hope that he will not carry out his concealed threat to write no more. Mr. Danvers wields a pen with no malice in it, and is always read with interest.

The Planting Expert draws attention to Sectional Meetings and the Resolution passed anent them.

Only second in importance is the publication of the letter from Mr. Noyce about the Pest Act, and the Pest Act itself. It is to be noted that the Government of India are prepared to consider any suggestions from the United Planters' Association.

Last week we published a note saying that a pamphlet was prepared on the Labour Question as discussed at the last Annual Meeting and was ready for distribution on application. The Editor cannot distribute these free, but has to charge 4 annas a copy to cover cost of printing and postage.

DISTRICT PLANTERS' ASSOCIATIONS.

Nilgiri Planters' Association.

(Continued.)

"ROADS AND COMMUNICATIONS.—Arsikere-Mangalore Railway.—Although this is no matter of importance to members of this Association, we congratulated our brother planters on what they have obtained after many years of agitation and waiting, and also noted with pleasure the forward policy of Government in railway communications.

"EUROPEAN DEFENCE ASSOCIATION.—We supported a notice drawing attention to the usefulness of this organisation and expressing sympathy with its objects. We hope that those of the N. P. A. who have not joined already will do so without delay. It is certainly to the advantage of every European to support it.

"LONDON SCHOOL OF TROPICAL MEDICINE.--The advantages of such an institution are apparent and need no explanation. We are of the opinion that as an Association we should do what we can to further its progress.

"LABOUR.—With the proposed establishment of a Labour Commission, Messrs. Waddington and Nicolls withdrew their schemes for the registration of maistries, as such a Commission in itself would include a kind of registration. You will have read in the papers the report of the Committee formed last year to consider the scheme for registration of coolies and the Hon'ble Mr. E. F. Barber's proposals which were:—

1. Abolition of the professional recruiter.
2. Establishment of a Labour Commission.
3. The question of advances or premium paid to secure coolies' services.

The meeting was very decided about the abolition of the professional recruiter. A resolution was carried asking the Government of Madras to suppress the professional recruiter. He was defined in the resolution as follows:—

"The professional recruiter is an individual who collects coolies and
" sells them at any centre, and afterwards ceases to have any further interest
" in their well-being, future, or whereabouts, as distinguished from the author-
" ised Kangany or Maistry."

LABOUR COMMISSION.—You all now have received copies of the deliberations of the Committee appointed at the meeting to go fully into the question of the establishment of a Labour Commission, to formulate working details and to report upon the whole question. We heartily supported the proposed Commission and hope that the N. P. A. will fully endorse our action by collectively and individually agreeing to support the scheme. The reasons for the establishment of such a Commission and the benefits to be accrued from it have been so fully put before you by the Committee that it leaves us little to add. Without adequate support the scheme cannot be the success it ought to be, and indeed must be, if you intend making any efforts to secure to yourselves an assured supply of labour in the future.

On the upper plateau of the Nilgiris you have a certain amount of local labour, but with new openings on all sides of you, that supply will be inadequate, even for those now favourably situated estates. Rates are rising, nay have risen 25 per cent. in many parts, and will rise more with the increased demand. To successfully combat this you must have imported labour and you must help your maistries to obtain, and having obtained, to keep their coolies, as from instances recently quoted you seem to be at the mercy of any unscrupulous recruiter. A Labour-Commission would practically eliminate such cases and the cost of same would be saved over and over again by the maistries' advances being made an almost safe investment instead of the gamble it is now, and by helping you to engage labour for your requirements, would tend to check the rise in rates. Moreover, your maistries would be helped to obtain good able coolies. The quantity and quality of work done would alone repay the cost, as it is, I think, generally admitted that the class of cooly you now get is far inferior to what you had a few years ago and work suffers in consequence. We ask you to regard the cost of working the scheme as an insurance policy. It will be the best policy you have ever taken out. The premium, Rs.2 per acre, cannot be considered heavy, even if it remained at that figure; but if the scheme gets the support it deserves to get, not only from members of association, but from those who from one reason or another are not now members of any association, the necessary amount required for the annual working of the scheme will become considerably less. The total acreage on the books of the U. P. A. S. I. is 140,000 acres. The total estimated expenditure of the scheme is, inclusive of Rs.30,000 initial expenditure Rs.1,50,000. The annual cost you will more than save by having an ample supply of labour to pick your leaf when ready, which means quality as well as quantity and in a like way be able to pick your coffee at the right stage, not green or over-ripe, as must occur if labour is short. At the meeting members representing 30,000 acres promised to support the scheme.

ADVANCES.—A resolution was passed urging as far as possible the limitation of advances.

ENTICEMENT OF LABOUR.—An instance which was brought to our notice by a member of the Association was put before the the meeting and a resolution was passed which we hope will meet the case.

NON-SERVICE OF WARRANTS.—We seconded the Wynaad resolution which was carried unanimously.

PEST ACT.—We agreed to this on the understanding that if it is introduced Government sholas, etc., should be included. It was recommended that before any general Pest Act became law, its provisions should be submitted to the U. P. A. S. I. for consideration and report.

COFFEE ADULTERATION.—We supported Mr. Mahon's proposal which was the same as carried last year.

TEA. –RAIL-FREIGHT ON TEA SEED.—We brought this matter forward and carried a resolution that the U. P. A. S. I. approach the Indian Tea Association asking them to use their influence to obtain concessions in the rates of freight on tea seed from all railways in India.

SCIENTIFIC DEPARTMENT.—You will be glad to know that the resolution was passed at our last meeting here on July 16th, was adopted and carried unanimously, and so we hope to have Mr. Anstead's valuable services for another period.

MYCOLOGIST.—We made the following proposal:—

> "That this Association considers that the services of a mycologist "under the direct control of the U. P. A. S. I. is necessary; that "there is a need for such an appointment is apparent from the "subjoined list of diseases on which investigation is required, "and that the Honble Mr. E. F. Barber be asked to urge the "matter on Government."

We are sure you will agree that such an appointment would be most useful to you and is really a necessity.

CINCHONA.—We supported the Anamalai resolution, being in accordance with our past policy.

THE LABOUR COMMISSION.—The Hon'ble Mr. E. F. Barber, in introducing this subject, spoke as follows :—

"I do not wish to take up the time of the meeting, but I should like to say a few words on the proposed Labour Commission. We have put the question of labour in the forefront of our planting difficulties for many years, for 20 years in fact, and of recent years the problem has become more pressing. Several proposals have been made to cure the difficulty and though these proposals have not met with general acceptance, they have served a purpose and we should thank those gentlemen who have spent their time and taken trouble in elaborating them. The first and perhaps the best known and most discussed was Mr. Brock's, then there was Mr. Marden's, while this year both Mr. Nicolls and Mr. Waddington brought forward proposals. At the last meeting in Bangalore a suggestion was made and a scheme formulated and this is before us to-day for discussion. There are no doubt many points that can be raised, but we may be sure that those points were raised and discussed by the Committee that formulated the scheme and we should remember. when discussing it, that this Committee represented nearly every planting district and that the scheme, as presented to you now, was adopted unanimously by the Delegates at Bangalore.

Well, the scheme is here for your consideration, the basis of it is self-help, and this, where it has been a question of putting our hands in our pockets, has not been readily forthcoming in the past. It is for us to decide as individuals whether we will support the scheme or not; we have not to come to a decision for the Association as a whole. If we think we shall benefit by it, from a business point of view, we should support it, if not, as business men, we should leave it alone. We shall criticize the scheme, but I do not think that the criticism should be comparative; if we see that we shall benefit by it we ought not to compare our benefit with another's or grudge any one deriving more benefit from it than we do ourselves.

I have had letters from planters objecting to the rate of Rs.2 per acre. I think this has been misunderstood. The Committee distinctly say that a little more than 1 rupee per acre would be sufficient from the whole acreage represented by the U. P. A. S. I. It is certain that some interests will not support the scheme but it is equally certain that some interests, not now represented on the U. P. A. S. I. will join in, so there is some hope that sufficient support may be forthcoming to reduce the cost to nearer one rupee than two rupees per acre. The two rupees asked for may be looked up on as a guarantee, for it is certain that so much will not be asked for if it is not wanted.

This scheme will not be a panacea for all our labour troubles, but it may enable us to hold the labour we have got and even to get back some we have lost. Also it may help us to get more coolies into currency by tapping new recruiting districts, but it is certain that it will give us a position as bidders in the labour market instead of being left outside the ring and forced to take what our competitors have rejected."

Mr. Nicolls then read a letter with reference to the work of the Ceylon Commission in the West Coast.

Mr. Dandison spoke as follows :—

' Since my return from Bangalore I have heard several views expressed upon the proposed Labour Commission.

They have all been more or less in favor of it, but doubt has been expressed as to what benefit estates which work almost entirely with local labour will gain.

Let us look at the Labour question generally and compare our position now to what it was a few years ago.

Speaking on labour, then, a well known member of this Association stated that he considered a man who could not replace runaway coolies in say three months, was not worth much. Could any of us replace a lot of bolters within three months now? I doubt it, except by raising rates or crimping, as on every side one hears complaints of shortage of labour.

What does this show? What else can it prove but that times have changed? While other countries have organised commissions, labour recruiting agencies, etc., in the very heart of our Labour district, we have done nothing, and it is no exaggeration to say that in a few years' time we shall be in a far worse condition than we are now unless, before it is too late, we do what we ought to have done years ago and unite to protect ourselves.

Regarding those estates which employ imported labour wholly, the advantages of the commission are apparent and there is no need to repeat these now as you have no doubt read the papers and also the pamphlet issued, but with regard to estates favourably situated as regards Local Labour there arises a difficult question, as they would naturally object to paying on an acreage basis for the very few tamil or canarese coolies that they require.

Quite right *at present*, but let him look ahead. Are their " Locals" going to remain and work at present rates of pay if there was a general rise of pay elsewhere, as there will be soon, unless we protect ourselves ?

No, certainly not, a few people will remain to look after their fields, but the young, able-bodied men and women will demand higher pay, and if refused, will go where they can get it, and migrate to another village, perhaps near estates that pay higher rates.

Now this is a point I want to make a strong one, that these estates *will* gain by supporting the scheme, directly as regards the few low country coolies they employ, and indirectly to a far greater degree, as with a general supply of Labour assured there will be no temptation for their " Locals " to leave their present villages; thus by helping others to obtain coolies, they will help themselves to retain their present supply.

Whether they should pay the same amount as others, whether it should be on an acreage or a " per coolie" basis is a point to be discussed to-day, but I appeal to them to join in under any circumstances and to remember that without general support the scheme cannot be the success we want to make it.

There are many old coffee estates being planted up with tea now. Where is the extra Labour to come from to cultivate these in the future? Tea cannot be run on coffee lines. More Labour per acre is required as flush must be picked when ready and if not picked then, means it is not only lost, but more coolies are required to " break back" or else an earlier pruning is necessary; in either case a loss. It cannot be gleaned from the ground like coffee which will remain on the trees for weeks very often before dropping.

We are nearing a crisis, but if we are prepared we shall pull through as we naturally have an enormous advantage over our competitors and it only needs co-operation on our part.

It is impossible to please everyone, as it is impossible to arrange equal benefits to all, but let us do our best to settle on some scheme that will be as fair as we can make it to all of us under our varying conditions.

The foundations have been laid and it remains for us to do our part in the building of the edifice. The structure can be adapted, I trust, to suit as far as possible requirements but remember that no scheme can be successful unless built on the strong foundation of Unity and this was solidly laid in Bangalore.

In conclusion, I would like to say that it would help matters along if any people who have objections to any proposals made would voice them now, as it is only by eliminating bad material that we shall be able to put our house in order."

Mr. Dandison moved the following resolution which had been adopted at a well-attended meeting of the Wynaad Planters' Association.

"That this Meeting is unanimous in considering that the Institution of a Labour Commission for South India is an urgent necessity, and that the members present agree to represent the position to their proprietors, recommending them to allow the estates they are in charge of to join the scheme if it is found that the promises of support justify the establishment of a Commission on the lines suggested in the report of the Committee appointed by the United Planters' Association of Southern India."

Mr. Harding Pascoe, in seconding Mr. Dandison, said that if a few years ago he had been told that Badaga labour would be leaving the district, he would have laughed. For the last several years he had been much about and had found Badagas working a hundred and fifty miles away and Badaga women working on rubber estates at practically sea level. This rather tended to show that Badaga labour was drifting away. Then again it was argued that the Malayalee would not go away, but now it was found that the Malayalee cooly was going to both Ceylon and the Straits. He said that a commission would be of great assistance and would give moral support to Maistries in securing coolies in the villages. He gave an instance where his maistry brought him his labour a month earlier than the required. On being questioned the maistry told him that if he had not secured the men then he would not have been able to bring the coolies at all. He said that this maistry will sooner or later consider whether it is good enough to go on, on these conditions, and that the result will be that if something is not done they will be deprived of the whole of their labour.

Mr. Barber at this stage quoted from the Ceylon Handbook certain figures which were very significant as regards the work done by the Ceylon Commission.

Mr. Sydenham Clarke then rose to propose an amendment. He said that he thought that instead of fixing Rs.2 per acre it would be better to fix the rate per imported cooly. He estimated that a coffee planter required half a cooly per acre and the tea planter one cooly per acre and therefore it would be more equitable if a poll tax were introduced, rather than on an acreage basis. Considerable discussion followed. Mr. Cockburn alluded to the rate of 30 cents per acre prevailing in Ceylon and thought that when a start had been made the rate would come down much lower and probably dwindle down to the Ceylon rate. Other speakers pointed out that definite guarantees had now come forward to something like Rs.80,000 and if another basis of calculation were to be adopted, the Association would have to start afresh and procure new guarantees. It was pointed out that it was necessary to have a fixed basis and procure new guarantees. It was pointed out that it was necessary to have a fixed basis and Mr. Golden remarked that a Re.1 acreage basis with a supplemental poll tax might work better.

Mr. Barber then pointed out that the whole of the money required worked out to but half per cent of the gross value of planters' produce exported from the Madras Presidency, which certainly could not be considered high and appealed to members not to consign the scheme again to the melting pot.

Mr. Deane said he was certain that coffee areas, with the present state of bug, could not stand the Rs.2 per acre basis.

Mr. Cockburn remarked that his estate was between that of Mr. Deane and Mr. Clarke and it was high time that coffee, which was so badly bitten with bug, should be replaced with tea.

A letter was next read from Mr. Nicholson, in which he stated that if the acreage rate was fixed at 1 Re. he would advise his estates joining. It was pointed out that here also a misunderstanding prevailed as to Rs.2 being the annual rate.

Mr. Clarke at this stage withdrew his amendment on the understanding that Rs.2 was not to be the annual payment per acre but that it was merely a starting guarantee.

Mr, Dandison's resolution was then put to the vote and carried by 15 for and 2 against. Various suggestions for the consideration of the Executive Committee were then made, one of which was that members who came in later should not be allowed to get in cheaply, since they had not participated in the initial expenses. A proposal was also made by Mr. Rogers, as regards the limiting of advances. This, members thought, was a matter to be dealt by local Associations and the matter was dropped.

In conclusion, members were asked to let the Executive Committee have, as early as possible, the acreage of their estates.

"The Hon'ble Mr. E. F. Barber proposed Mr. D. Elkington as a member of the Association, who was duly elected.

The meeting terminated with a vote of thanks to the chair and to the Collector for the use of the room.

Papers on the Table—

Planting Gazette, August 1913.
Year Book of Ceylon Planters' Association.
Catalogue of "Monkey Jacks."
Book on Rubber in S. India.
Memoirs of Dept. of Agriculture Vol. 1 No. 2.
Do Vol. III No. 2.
Do Vol. VI No. 2.

Agricultural Journal of India, July 1913.

Dept. of Agriculture, Madras, Vol. III, bulletin, No. 66.

G. O. No. 214 dated 18—7—13. Report on Government Botanical Gardens and Parks.

G. O. No. 1622, dated 11—8—13 on the working of the Planters' Labour Act I of 1903.

E. F. BARBER, *Chairman.*

J. S. NICOLLS, *Hony. Secretary.*

North Mysore Planters' Association.

Annual General Meeting held at Balehonnur, on September 26th, 1913,

PRESENT.—Messrs. E. C. Bolton, C. Danvers, F. W. Hight, E. H. Young, C. P. Reed, R. G. Foster, S. L. Mathias, A. F. Evetts, Major Ricketts, T. Hunt (President), W. H. Reed (Honorary Secretary). *By Proxy*: E. W. Fowke, J. Pais, E. Luud, D. Mathias. *Visitors*: Captain Ricketts, Mr. I. Saldanha.

Honorary Secretary's Report & Accounts.—Gentlemen,—In laying before you the Accounts for the past year I have to remark that since the last Annual General Meeting no new Estates have joined. There are now 54 Estates on the Rolls, representing 10,460 acres. Subscriptions amounting to Rs.290-8-0 for five Estates are still due. The Income for the past year amounts to Rs.4,939-11-0. Against this there is an Expenditure of Rs.4,198-3-7 leaving a surplus balance of Rs.741-7-5 on the year's working.

The funds at the credit of the Association amount to a floating balance of Rs.2,915-9-0 and Rs.4,000 on deposit with the National Bank.

Benevolent Fund.—I have remitted Rs.130 to the Secretary, U. P. A. S. I. There is still a balance of Rs.60 due by subscribers.

I beg to submit my resignation of the Honorary Secretaryship.

President's Address.—Gentlemen,—I will not detain you long. I only propose to tell you about a few matters that have engaged the attention of the Association during the past few months. Delegates from the three Associations interviewed the Dewan about the proposed Labour Act, and some small modifications were suggested.

A meeting of the Council of Mysore Planters' Associations was held in Bangalore in August, at which the Scientific Officer and the Mysore Assistant were present. Disappointment was expressed by the Members at the progress made in Agricultural experiments, etc., especially the experiments with regard to "Black Rot."

I will address you later on on the Labour Commission scheme.

I have to thank you for having done me the honour of electing me as your President for the past year, and now beg to tender my resignation.

Income Tax.—This was fully discussed, and it was decided "That the imposition of an Income Tax as suggested and passed at the Economic Conference, does not meet with the approval of this Association and the Dussarah Delegate be instructed to oppose the same."

Labour Commission.—After a long discussion and after the President had explained the method of working of a Labour Commission, the following Resolution was put from the Chair:—

(1) "That this Association is in favour of supporting the Labour Commission scheme, but that it is not only advisable but absolutely necessary that further information as regards working details be circulated as speedily as possible, for the benefit of Members (who have not attended meetings) and non-members who are quite in the dark as to the methods of working a Labour Commission."

(2) The following Amendment was proposed by Mr. E. C. Bolton and seconded by Mr. C. P. Reed:—

"That in view of the present depressed state of the Coffee Market and the eight anna subscription at present paid by the members, also the proposed large increase in coolies pay, this Association does not see its way to support the Labour Commission on the very expensive lines drawn up by the Committee appointed by the U. P. A."

The above Amendment was put to the Meeting and lost.

The following Amendment, was proposed by Mr. Lund and seconded by Mr. Bonner: "Considering the importance of the Labour question, this Association requires more information as to the benefit Mysore would derive from the proposed Labour Commission, and it is resolved that a Committee be appointed to enquire into the desirability of supporting the Scheme and report to an Extraordinary Meeting of the Association to be held at an early date."

This Amendment was put to the Meeting and lost.

The original Resolution was then put and carried by a large majority.

Labour Question.—This was very fully discussed and a petition signed by 58 estate labour suppliers, asking for an increase of pay to coolies was read. It was decided that the matter of raising coolies' pay immediately be left over until the next Quarterly Meeting in December next, so as to enable members to fully consider the matter.

Roads and Communications.—A petition signed by many land-owners and ryots resident in the Mudigere and Koppa Taluks, referring to the impassable state of the Magoondi Kalasa and the Balehole-Basricatty Roads, was read.

The Association complained about the state of these roads at the meeting held in December last. and the subject was represented to Government on January 6th. Their reply dated 31st January says that the matter will be referred to the Chief Engineer and President of the Kadur District Board.

It was decided that the petition be forwarded to the proper authorities, and that it is strongly supported by the Association.

Central Manure Works.—A letter from the Deputy Commissioner, Hassan District, asking if planters were likely to support Manure Works started in Hassan. *Reply*: This Association thinks it advisable to point out that to obtain support from European planters it would be necessary to:

(1) Supply Manures under a guarantee as to purity.

(2) The Works would have to be sure of a steady and certain supply.

Provided that the above conditions are fulfilled and prices such as can favourably compete with imported manures, we think the scheme would meet with considerable support from planters.

Election of Office Bearers—This resulted in the election of Mr. T. Hunt, President and Mr. W. H. Read, Honorary Secretary.

Shevaroy Planters' Association.

Proceedings of the Annual General Meeting of the Shevaroy Planters' Association held at the Victoria Rooms, Yercaud, on 30th September, 1913.

PRESENT —J, P, Bedford, Esq., I. C. S. Messrs. S. Campbell, B. Cayley, E. Dickins, H. Dickins, H. Dyer, R. A. Gilby, R. Gompertz, Paul Goubieat, S, M, Hight, A. B, Kundaswamy, C. G. Lechler, W. J. Lechler, J. C, Large, C. Rahm, W. Rahm, Revd. Father Rochet, B. N. Short, C. K. Short, F. D. Short, L. B. Short, E. W. Short, E. Sans G. Turner, H. Whittle, Pringle Waldeck and Ch. Dickins (Honorary Secretary). Mrs. F. Campbell by her proxy Mr. Gilby, Mr. D. S. Robinson by his proxy Mr. C. Rahm, and Mr. F. Pegge by his proxy Mr. C. Dickins.

(1) The Notice calling the Meeting was taken as read.

(2) *The Late Mr. W. W. Hight.*—The Chairman on opening the meeting said he felt it his sad duty to refer to the loss the Association had sustained by the sudden and unexpected death of Mr. William Hight, who was well known in the community. He was a sportman and a good fellow and was for many years a member of the Association. He felt sure the late Mr. W, Hight's death would be felt by all and moved the following resolution which was seconded by Mr. J. C. Large and carried unanimousiy,

"That this Association write to Mrs. Hight expressing its deepest sympathy with her in her sad loss and also to his brother Mr. S. M. Hight."

The Labour Commission Scheme,—After a long debate on the subject the following proposal was made by Mr. G. Turner and seconded by Mr. C. Rahm:

"That in the opinion of this meeting the institution of a Labour Commission for S. India on the lines suggested in the report of the Commirtee appointed by the U. P. A. S. I. is a most desirable and urgent measure and that it agrees to strongly support the scheme."

Result of Voting.—24 for. Against 3 *viz.*, Messrs. J. C. Large, A. B. Kundaswamy, F. Pegge. Messrs. Bedford, Sans, and Waddeck did not vote.

Mr. E. Large wrote in stating that he had referred the matter to his proprietor at Home and anticipated a reply in the affirmative.

(3) *Delegate's Report.*—Mr. Turner read his report, emphasising the fact that every member of the Association should provide himself with a copy of the U. P. A. S. I. Proceedings.

Proposed by Mr. C. G. Lechler and seconded by Mr. B. Cayley and carried unanimously: "That Mr. Turner be thanked for representing this Association at the U. P. A. S. I. Meeting, and for his interesting report—also that the same be printed."

(4) *Honorary Secretary's Report.*—The Honorary Secretary read his Annual Report and Statement of Accounts. The Accounts were examined by Messrs. B. Short and C. Rahm and found correct.

Proposed by Mr. B. Short and seconded by Mr. G. Turner and carried unanimously: "That the Honorary Secretary be thanked for his report and that the same be printed together with statement of Accounts for distribution amongst the members."

(5) *Repairing of Machinery, &c.*—Read letter dated 7-9-1913 from Mr. A. C. Nicholson with reference to repairing of machinery, pulpers, &c., &c., executed on the Hawthorn Estate from 1st October.

(6) *Small Consignments of Goods—Delivery of, to residents on the Shevaroy Hills,*—Resolved: "That the Honorary Secretary be requested to thank the General Traffic Manager, S. I. R., for his letter G. O. 401/15 dated 10th September, 1913."

(7) *Re-Correspondence of* 16-4-1913 *published in P. C. of that week,*—Read letter No 200 dated 18-9-1913 addressed to this Association from Mr. D. Daly.

Resolved: "That the Honorary Secretary be requested to inform Mr. Daly that the Association would write to the Editor, *Planters' Chronicle*, asking him if he will publish all Mr. Daly's correspondence addressed to the Association dating from 16th May 1913 if so, to do so."

(8) *Alteration of rule* 9 *of the S. P. A.*—Mr. Bedford moved the following motion, which was seconded by Mr. R. A. Gilby and carried unanimously: "That Committee meetings be held every quarter between each quarterly meeting, in substitution for rule 9."

(9) Election of Office Bearers: The following Committee was elected for the coming year:—

Messrs. F. D. Short,
S. M. Hight,
C. Rahm,
C. G. Lechler,
W. Rahm,
G. Turner,
Revd. Father Rochet,

and Mr. C. Dickins was unanimously elected Honorary Secretary.

(10) *Vote of Thanks.*—A vote of thanks to the Chair terminated the meeting.

CHAS. DICKINS,
Hony. Secy., S. P. A.

Kanan Devan Planters' Association.

At the Extraordinary General Meeting of the above Association held on September 27th, 1913, the following Resolution was unanimously agreed to:—

"That this Association is in favour of any scheme that will tend to reduce rates of advances and reduce and regulate competition for coolies in South India, but is not in a position to decide for or against proposed S. I. Labour Commission, and that therefore the scheme be referred to all Proprietors of Estates in the District."

CORRESPONDENCE.

Government of India,
Department of Revenue and Agriculture,
(Agri:).

From

Simla, the 30th Septemberi 1913.

F. Noyce, Esq., I. C. S.,
Under-Secretary to the Government of India,

To

The Secretary,
United Planters' Association of Southern India.

Sir,—I am directed to acknowledge with thanks the receipt of your letter No. 15 dated the 17th September, 1913, with which you forwarded a copy of Resolution carried at the Annual Meeting of the United Planters' Association of Southern India, advocating in view of the presence of Green Bug in Coffee Estates in Southern India, the introduction of some form of internal pest Act in order to strengthen the hands of the scientific staff employed in stamping out the pest. The resolution further suggests that before any general Pest Act becomes law, its provisions should be submitted to the United Planters' Association for consideration and report.

2. With reference to the latter portion of the resolution. I am to say that a copy of the Bill to prevent the introduction into British India of any insect, Fungus or other pest which is or may be destructive to crops, and of the statement of Objects and Reasons, has. it is understood, been forwarded to you by the Secretary to the Government of India in the Legislative Department and that Government of India will be pleased to consider any suggestions which the United Planters' Association may wish to offer. It is requested that any communication in regard to the Bill may be addressed to the Secretary to the Government of India in the Legislative Department.

I have the honour to be,
Sir,
Your most obedient Servant,
F. NOYCE,
Under-Secretary.

Meppadi, September 30th, 1913.

The EDITOR,
The Planters' Chronicle.
Bangalore.

The Labour Problem.

Dear Sir,—I have read Mr. Mead's very able letter with much interest. I regret the view he takes of the proposed Labour Commission, more especially as what he says on other connected subjects appears so very sound.

Mr. Mead's statement of some of the causes of our present troubles is perfectly correct: but in his enumeration I think that he has left out one large factor, and that is the lack of combination among planters on this all-important matter that has hitherto existed. The proposal to establish a

Labour Commission for the whole of South India is an attempt to remedy this defect. The Delegates at this year's U. P. A. S. I. Meeting were not men likely to follow a bliud lead. Many were new comers, influential men in their Districts who were there to demand a remedy for their labour troubles which were becoming intolerable.

In my opening address I specially asked for criticism of any scheme that might be put forward, and even if Mr Mead's criticism were destructive it is much preferable to what I have called the "let the—fool talk attitude" which might have allowed his Association to promise support to the Commission and then to find that half its acreage stood out. The old method of calling everyone who differs from the Chairman and the Planting Member a putrefying idiot silences criticism, multiplies votes against you, and leaves you drivelling about "ingratitude" for the rest of your time. I think that when Mr. Mead sees his letter in print it may occur to him that his arguments sometimes destroy one another. At any rate I hope he will come to the December Meeting ready to thrash the matter out.

Is Mr. Mead pleased with the present Labour position? Evidently not, for he admits the necessity of some action, and of the establishment of District Labour Commissions. This would, I think, be a mistake. The Assistant Commissioners stationed, as it is proposed they shall be, in the various recruiting Districts under the control of the Commissioner and the U. P. A. S. I., will work on a system and for a common object. Whereas under Mr. Mead's scheme there might be 3 or 4 men in a small space competing with one another as well as with their overseas rivals and the evil would only be intensified. The Commission will certainly not be able to do away with competition, but one of its duties will be to regulate it.

There is another consideration that should not be lost sight of. The District Commissions would have no status comparable to that of a combined one, or that of the Ceylon Commission.

I venture to say that Mr. Mead is wrong in stating that recruiting for Districts is confined to Zones. It may have been so a few years ago. But the increased competition aided no doubt by the constant shifting of Superintendents to which he alludes has brought about a complete change. South Canara people who used to work exclusively in Mysore now go to Malabar, Cochin and Travancore as well as Wynaad. Gangs of Badugas come to Wynaad. The Canarese who used to work here and in the Nilgiris are going to the Anamalais.

Any Wynaad Estate used to be able to count on getting a fair number of Coimbatore coolies who came in towards the end of July. That source of supply has completely dried up. The coolies seem to have been drawn away to Ceylon, the Straits, Cochin and the Anamalais. In other Districts I believe a similar mix up has occurred.

As for what Mr. Mead says about his preference for sending the planter to do his own recruiting, he is the Manager of a large Company with a number of European Assistants, and has every right to his own opinion. One does not want to advertise or magnify one's own troubles. But the Tea Planter short of coolies, struggling to keep up with his flush, driving his pluckers out 7 days a week and with his factory working 16 hours or more in the 24, simply cannot leave the Estate to go and hunt up coolies and Maistries in their villages.

I cannot see what reason Mr. Mead has for thinking that there is a near prospect of our labour difficulties disappearing. Tea has been opened largely, and rubber enormously, in the last few years. Boom or no boom, the tea will have to be plucked and the rubber tapped. If rubber prices remain as they are, or go lower, expenses will have to be cut down and coolies worked harder. That will lead to more trouble. If prices improve considerably there will be more opening. It seems to me that this is no time to let matters slide.

If any improvement can be effected in the Labour Commission scheme as published, the Executive Committee will welcome suggestions, and as I have said, we hope that Mr. Mead will come to Bangalore and help us with his advice.

Meanwhile, there is the U. P. A. S. I. scheme. Mr. Mead and I know all the men who drew it up. For my part I have a great respect for their opinions. The cost has been said to be too great. But even for the first year, which will be the most expensive, four pounds of coffee or "common" tea, or one pound of rubber per acre will pay for it. It may mean the saving of the Planting Industry. If merely as a sporting proposal we ask Mr. Mead and other doubters to give it a trial.

Yours faithfully,
C E. Abbott.

5th October, 1913.

The Editor,
The Planters' Chronicle,
Bangalore.

Labour Commission.

Sir,—While disagreeing in toto with the criticisms of the proposed Labour Commission contained in Mr. Mead's letter of the 22nd ultо., his idea of District Commissions is particularly unfortunate. The chief object of a Commissioner will be to organise and hold things together, if necessary to arbitrate, and if Mr. Mead is laughing now at the "constant quarrels and complaints that one district is getting more for its money than another" which he foresees as the result of united Labour Commission, he will probably go into hysterics if he thinks over the effects of the constant quarrels and complaints, &c., which would be the inevitable result of a District Commission scheme, such as he suggests.

To Mr. Mead's objection to a Commissioner, and incidentally to the Labour Commission scheme, on the ground of expense, I should like to ask him if he knows, or has made enquiries, what it costs to run any sort of private commissisn. Rs.2 an acre, and that probably for the first year only, may seem a lot of money, but it is cheap compared with the cost of a private commission, and I venture to think it will be considerably cheaper and quite as effective as a District Commission scheme such as he favours. Wynaad Estates employ Canarese, South Canara coolies, Coimbatore and Erode Tamils and Malabar Malayalams. Does Mr. Mead think that a Commission run by the District of Wynaad, unless it was on as large a scale as the U. P. A. S. I. Commission scheme proposes to be, could possibly keep in touch with, and work satisfactorily over, such a large area, and at a less cost per acre to the estates joining.

I take it that amongst ourselves what we want to eliminate as far as possible is "Competition." We have quite enough to compete against in the Straits and Ceylon, and it seems to me that the scheme of independent District Commissions, such as Mr. Mead suggests, would *create* competition. I do not think the proposed Labour Commission Scheme would in any way hinder a district, while has recruited almost wholly from one centre in the past, from doing so in the future, and I think that what Mr. Mead has lost sight of is, that this proposed Labour Commission Scheme will not be a recruiting agency. It will be a Banking, Forwarding and Helping Agency, in fact almost everything *except* a recruiting agency.

I am, Sir,
Yours faithfully,
W. EVERETT BOWNASS.

The Labour Problem.

The EDITOR,
The Planters' Chronicle,
Bangalore.

Sir,—I am tired of seeing my name in the *Chronicle* and many will doubtless say "What! Danvers again?" but I crave your and their indulgence once more, as I should like to make an appeal to my brother planters.

First, let me welcome Mr. Mead, who sent a racy letter last week; and who would have thought that the Rose of Raciness could rear its head in the thorny wilderness of the Labour Problem? It was also a very characteristic letter, and made me feel pleasantly as if I had met Mr. Mead again. I would like to follow him through his paras. as that will lead up to my appeal.

Legislation.—Mr. Mead is unquestionably right in his view of this, and in his conclusion that no Act can be framed which is of any use to the planter; only I would substitute "satisfactory"—for "any." We must have legislation for the "excrescences"—the dishonesties attached to the business of labour supplying. As to Act I, *with* extradition, I am indeed an unwilling convert; the sort of convert the Inquisition used to make with racks and boiling oil. Extradition is necessary, I think (unless the Labour Commission goes through) for though those in the enjoyment of it are not immune from bad debts, are they prepared to say that the bad debts would not increase if extradition were withdrawn? Ever since Act I came on the scene I have maintained that 50% of its value would be dissipated by Police short-comings, while all of its objectionable features would remain, and it would tend to lessen, more and more, our personal influence with our labour. It is the spirit of 1913 dealing with undeveloped creatures of the Heolithic Age; it is a comparison of unlike kinds; and it is a stone when we asked for bread. But it may bring extradition, and if this is not all that some fancies paint, it will act as some sort of check on unmuzzled roguery.

Our views are all coloured by local circumstances, and I have not heard of any village tribunal in *our* recruiting grounds which settles anything as between maistry and cooly; these disputes are frequently brought to the Estate Manager whose time is taken up by attempting to unravel complex tissues of lies.

Mr. Richardson's was "truly an awful confession," but he recognised things as they are and wished for reasonable safe-guard; Mr. Mead tells us what we ought to be. But even supposing that perfection existed among planters, we know it does not among recruiters; the planter is often presented with coolies supposed to be legitimately recruited but who have been crimped from another maistry, and he knows no more than his man tells him. In our own district we settle these matters by enquiring face to face—but how is this to be done when the coolies have gone beyond the boundary? As temptations increase and facilities for avoiding performance of contract also increase, surely it is necessary to take some measure or other, The best we can, though the balance of profit may be small. But we might do without Act I, as I hope to show.

Shortage of Labour and its Causes—What Mr. Mead says under this head is very sound—only I am not sure that there *never* has been any crimping; and as to the F. M. S, I heard that they intended from 1st October not to reduce pay but to increase tasks 25%. I am sure I hope that this is true, and the Government of Madras may enquire or not as it likes. In any case it counts for us.

Proposed Labour Commission.—This in my opinion is the soundest scheme that the planters of S. India have ever had, and I tender by unstinted congratulations to the originators and framers of it whether it carries through or whether it fails from want of support. It is not yet perfect, no doubt; but perfection, like confidence, is a plant of slow growth, and changes can be made as time and experience suggest. Again I will follow Mr. Mead.

1. I am mostly with him here. It is to the sub-divisions that we must look for our greatest help and I would like to see the Agents of those sub-divisions paid on a more liberal scale, while the central agent be correspondingly reduced. But I think it advisable to have a central head as it will tend to greater cohesion and co-operation between the sub-divisions, which to my mind is the essence of the scheme. Disconnected agencies may develop jealousies or at least rivalries, and as the chief value of the agency to us in Mysore will be not the recruiting of labour but the recovery of such has bolted to outside our own sphere of influence, it is to us *entirely necessary* that there should be homogeneity and co-operation in the Labour Commission spheres: without this the Commission will lose value, and I doubt if it would be extensively supported.

3. 4, 5 & 6 are not very important prints for discussion here. It will take the Commission all its time if it is going to see that every maistry uses his advances for legitimate purposes—but no doubt some good will accrue, and the intentions are excellent.

7. This will be of value to a good many, for circumstances vary.

8. Mr. Mead evidently agrees with this, a very strong point in the scheme.

9. Each agency can confine itself to the attractions of its own district or districts, and can probably advertise better than an Association.

10. Some may be able to go when and where they like, but many cannot and I think this clause sound.

11. Same applies.

12. I don't want to laugh at all! Mr. Mead foresees the human element stepping in and consequent quarrels and complaints. Human nature is so, and what can a poor Labour Commissioner do to alter it? But we can *try* to promote harmony and good-will, even if some insist on striking discordant notes. If a man in Travancore gives up my bolted coolies, I shall be very willing to give up his; and the agency will be a powerful factor in aiding people to keep to the narrow path of honesty and straight dealing. On this the whole thing depends.

13. I echo Mr. Mead's "How? you cannot do away with competition." It is a common thing with us for the richer suppliers to use their own money as well as the Estate advance, and so out-bid poorer suppliers. Competition all along the line!

14. I have lost no money to speak of for 15 years, but am horribly afraid of what the future holds without this Labour Commission.

Now, the Labour Committee has unfortunately not published its idea of how the scheme will be worked, and many are in doubt as to whether it will be to their advantage to join. We understand that maistries will be advanced, through the agency and labour more or less kept on the rails; but we have had no official information on what to us is *the* great idea. We have been un-officially told that if labour goes to the wrong place it will be recovered by the Commission and set on its proper path; if a maistry and his gang after taking advances from Travancore go to Wynaad, the Superintendent of the harbouring Estate will be requested to send them back—and he will do so. If they go to their village, the agent will get them back, or hurry them.

This is what appeals to me!

Let us all join the Labour Commission—let us all sign an agreement to return coolies that we have no right to—and Act I and other legtsiation may be left alone. The agent can ascertain, or be informed, where coolies have gone—most maistries know where their coolies have bolted to. It will stop the taking of advances by maistries in two places—it will keep the cooly from being claimed (as he is in South Canara) by 3 or 4 maistries—it will keep us all, employers, recruiters, and coolies, in the "narrow path of honesty"—it *will* tend to promote harmony and good-will among the great majority—above all. if whole-heartedly worked it will save us (at any rate for some time) from that "sharp hooked bundle of dry feathers," that compares of unlike kinds, that destroyer of personal influence, Act I of 1913.

Brother Planters, can we not do this? It is easy—it is honest—it is politic—and I think it will be cheap. Still we must face competition—still our rates will probably go up; but though we may advance more highly and pay more highly, we should be able to feel more secure of our dear-bought labour coming in.

The tendency of all clever and sarcastic minds is towards criticism—Mr. Mead has criticised, in and I appeal to him to now turn his talents to constructiveness. Will he, coninjuction with other experienced friends, help the Labour Commission towards fruition and perfection by helpful suggestions? Without the aid of such as he the scheme will work imperfectly, and cause will be given to the scoffer to blaspheme.

Something must be done; here and there conditions may now be favourable, but they cannot remain so. Here is a scheme which, if worked in the right spirit. should be a boon and a blessing; here is an opportunity to "combine" to our own great advantage, moral, mental, and financial, and with distinct eventual advantage to the cooly also. Can we not take advantage of it? Are we to confess ourselves feckless and unprescient? and are we to revolve eternally in a vicious circle of appeals to Government for legislation one time and condemnation of all legislation another?

Yours faithfully,

C. DANVERS.

Labour.

Sir, I have read with much interest the letters recently appearing in the *Planters' Chronicle* on this subject. I think it is a good sign that this matter is receiving more attention in your columns and I hope therefore that my crude remarks may pass the censorship.

It seems to me that the first questions to be asked in attempting to solve this problem are: What are the chief difficulties to be met? Is it possible to overcome these? If not, can anything be done to lessen them or mitigate the evil and, if so, what is the best mode of procedure?

Of course I recognise that there are complications and side issues, but when we are dealing with a complicated case it is usual to try and remove the most serious symptom, or condition, first.

I take it therefore that the answer to the first question may be put somewhat in this shape: "A shortage of labour at rates which make our produce remunerative, or a disorganised state of available labour leading to reduced or vanishing profits."

Let us suppose for a moment that there is sufficient labour available in South India to meet our requirements, the next question appears to be—Can the grower of any particular product afford to pay a higher wage than the growers of other products, or is there any district so favourably situated that it can afford to outbid another? If so, the laws of supply and demand come into play at once and the product, or district, which can afford to pay highest gets its requirements served first; no commission in the world is going to alter this.

That such a state of matters does exist is undoubted, and it is this, added to the varied local conditions in the different recruiting grounds, that has made the situation so complicated, apart from foreign competition.

Mr. Danvers tells us that he is assured Coffee is going to be the first of our products to go to the wall—but even Coffee is not going to the wall without a struggle, and supposing large areas of Coffee are abandonedthere are extensions under other products here and in other countries, while industrial concerns are springing up and expanding to absorb any labour released, so the position is not likely to improve even for those stronger branches of the Industry. I think, therefore, it is safe to assume that our difficulties will remain and probably increase.

The product which holds the strongest position to-day may again have its period of depression and, unfortunately, these adjustments as between the Producer and Consumer are generally slower and do not always correspond with a conflict between Capital and Labour which is sharper and its effect more immediately felt. We are dealing with agriculture.

Now, is it possible to completely overcome our difficulties? No--very well—but can nothing be done to put things on a sounder footing? Yes, surely - How? One man says "stop emigration," another "Restrict extensions"—"Do away with advances; "Have extradition;" "Let the weak go to the wall;" "Raise wages," etc., etc.,—Raise wages! Oh yes, we are going to raise wages all right whether we like it or not, but this alone is not going to relieve the pressure for any length of time, it is simply following the law of supply and demand, just as the weak going to the wall is a law of nature.

Mr. Mead lays great emphasis on *Competition*, which he says "is ever present in any business," as a cause of our trouble. True—and what is the result in most cases when competition gets to that stage when it threatens to ruin an industry? *A combination of interests* Is there any combination among planters in this respect? None—therefore, I say the most serious sympton of the case is —lack of combination.

If my argument is sound this can be remedied. But what is the best way of proceeding? Surely by having a Special Labour Department under the U. P. A. S. I. Combine first in establishing this, then consider minor proposals such as Mr. Mead's to have separate district Agencies, or Committees to deal with different products.

To admit that the case is complicated. or that one product or district is in a stronger position than another, is not to say that recruiting and advancing should not be regulated and protected, and I hold that a central or combined Agency is the best way of doing this. Separate agencies would do little, I believe, to stop interdistrict troubles, nor would a number of minor agencies be able to cope with foreign competition in the same way as a combined department under the U. P. A. S. I.

As to the cost—what is Rs.6 per acre spread over 5 years compared with the capital involved, or for that matter with the advances issued to maistries? The Committee's draft scheme is a very rough one. It was never supposed to be more than a mere indication of a line which might be followed, developed and modified to suit the needs of the case as these become clearer. Mr. Meed's contention that different districts have their own recruiting centres seems to me to strengthen the case for a central commission. Is it not a fact that these centres are now being tapped by other districts, to say nothing of foreign competition ?

Mr. Mead appears to be shocked that we should require to protect ourselves from crimping among ourselves. I am very glad to learn that a man of Mr. Mead's experience is able to look at things in that light. I am sorry to say I am obliged to take Mr. Richardson's view, and it is well to remember " how oft the means to do ill deeds makes ill deeds done ".

With what Mr. Mead says as regards the manner in which Labour is worked I fully agree. Men generally are not, in my opinion, in such intimate touch with their labour as they used to be, and I find both Labour and Subordinate Staff very unsettled another argument in favour of combination among Owners.

It seems not quite fair to blame wealthy Companies, as Mr. Mead does, for their ignorance with regard to opening land ; presumably they are guided by gentlemen on the spot who report for them, and if the seriousness of the Labour question has been minimised it is hardly the fault of the Companies.

Yours faithfully,
Geo. L. Duncan.

No. 875 of 1913.

Office of the Planting Expert,
Bangalore,
7th October, 1913.

The Editor,
Planters' Chronicle,
Bangalore.

Sectional Meetings.

Sir,—With reference to the excellent suggestion made in the last paragraph of Mr. Mead's letter published in your issue of 27th September, I beg to remind your readers of a similar suggestion which I had the honour to put forward at the Annual Meeting of the U. P. A. S. I. in 1911, namely that Sectional Meetings should be held each year in convenient centres to get together men from groups of Districts to discuss special subjects in which they had a common interest.

My views on the subject then expressed will be found in the *Planters' Chronicle*, Vol, VI., Page 549, and the full text of the resolution passed giving effect to those views will be found on page 556. This resolution though carried has evidently been forgotten, a fate which is shared apparently by a large number of the resolutions passed at Annual Meetings of the U. P. A. S. I.

I remain, Sir,
Yours faithfully,
Rudolph D. Anstead,
Planting Expert.

PEST ACT.

The Destructive Insects and Pests Act, 1913

This Bill is the outcome of representations made by the Bombay Chamber of Commerce as long ago as 1906. In 1910 the Government of Madras asked for the views of the U. P. A. S. I. upon the subject and it may be remembered that a number of letters from different public bodies together with a note by the Scientific Officer were published in the pages of the *Chronicle* (V p. 497). In November 1911 a special Committee of experts, of whom the Scientific Officer was one, met at Pusa to consider the matter and advise Government as to the form of legislation necessary. In 1912 the Scientific Officer wrote a number of articles in the *Chronicle* dealing in detail with the subject and describing the working of Pest Acts in general (Scientific Officer's Paper CIX) and at last the Government have before them a Bill which gives the power to control the importation into British India of articles likely to cause infection to crops. In a recent issue the speech made by Sir Edward Maclagan when introducing this Act into the Imperial Council at Simla was published, and we are now able to publish the actual text of the Act which is as follows:—

A Bill to prevent the introduction into British India of any insect, fungus or other pest, which is or may be destructive to crops.

Whereas it is expedient to make provision for preventing the introduction into British India of any insect, fungus or other pest, which is or may be destructive to crops It is hereby enacted as follows:—

1. *Short Title.*—This act may be called The Destructive Insects and Pests Act, 1913.

2. *Definitions.*—In this Act, unless there is anything repugnant in the subject or context,—

(*a*) "crops" includes all agricultural or horticultural crops, and trees or bushes;

(*b*) "import" means the bringing or taking by sea or land; and

(*c*) "infection" means infection by any insect, fungus or other pest injurious to a crop.

3. *Power of Governor-General in Council to regulate or prohibit the import of articles likely to infect.*—(1) The Governor-General in Council may, by notification in the *Gazette of India*, prohibit or regulate, subject to such restrictions and conditions as he may impose, the import into British India, or any part thereof, or any specified place therein, of any article or class of articles likely to cause infection to any crop.

(2) A notification under this section may specify any article or class of articles, either generally or in any particular manner, whether with reference to the country of origin, or the route by which imported or otherwise.

4. *Operation of Notification under Section 3.*—A notification under section 3 shall operate as if it had been issued under Section 19 of the Sea Customs Act, 1878, (Act VIII of 1878) and the officers of Customs at every port shall have the same powers in respect of any article with regard to the importation of which such a notification has been issued as they have for the time being in respect of any article the importation of which is regulated, restricted or prohibited by the law relating to Sea Customs and the law for the time being in force relating to Sea Customs or any such article shall apply accordingly.

5. *Power of Local Government to make rules.*—(1) The Local Government may, subject to the control of the Governor-General in Council, make rules for the detention, inspection, desinfection or destruction of any article in respect of which a notification has been issued under Section 3 or of any article which may have been in contact or proximity thereto, and for regulating the powers and duties of the officers whom it may appoint in this behalf.

(2) In making any rule under this section the Local Government may direct that a breach thereof shall be punishable with fine, which may extend to one thousand rupees.

6. *Protection to persons acting under Act.*—No suit, prosecution or other legal proceeding shall lie against any person for anything in good faith done or intended to be done under this Act.

CEYLON RECRUITING AND DAMAGING STORIES AT THE COAST.

From an interesting report by Mr. J. H. Rutherford Lee, which appears in the September number of the *Planting Gazette*, it would seem that the people in these and neighbouring districts know all about Ceylon, and prefer Penang. Stories are told of coolies who have been to Ceylon, and have been swindled, free passages are ridiculed, it being argued that the cooly has to pay for it after all, and that the kangani continually takes it out of him in rice and pay. It was also alleged that the cooly was not allowed to go near the Superintendent, and that, although there were no cases of ill-treatment by the Superintendent, the latter did not care. Such stories are indeed difficult to refute, and there seems every argument provided here in support of the system of the accounts of each individual cooly's indebtedness being kept by the Superintendent. There should be far more communication between the Dorai and the cooly. It is stated that the coolies, like the system, vary much on estates where it is now in operation, but that the kangani does not. The moral is obvious; and anything that tends to put an end to these unfortunate stories at the Coast should be welcomed, for unless the cooly in his village has a favourable idea of the place to where he is going the whole Commission might as well be abolished. —*The Ceylon Observer.*

NETHERLANDS EAST INDIES.

COFFEE (1913 CROP) ON SALE.—H. M, Consul at Batavia (Mr. J. W, Stewart) reports that a sale of Government coffee of the 1913 crop will take place in the rooms of the " Handels-vereenignig" at Batavia on 15th October and 26th November next. The quantity to be offered for sale is 13, 811 piculs, the unit for sale purposes being the picul of 136 English lbs.

A statement (in English) of the conditions of sale may be seen by United Kingdom firms at the Commercial Intelligence Branch of the Board of Trade, 73, Basinghall Street, London, E. C.—*The Board of Trade Journal.*

The French Consul at Rio is said to have reported on the excess cost of living in Rio as compared to Paris as being equal to 3·5 to 1, so that an employee earning fr. 495 a month in Rio can scarcely live as one who earns fr. 200 in Paris, and certainly cannot save on such pay—*Tropical Life.*

How to take Samples and send Specimens for Examination.

Soils.

To obtain a fair average sample of the soil in a field for analysis, as nearly as possible equal quantities of soil are taken from not less than, four different parts of it. At the places chosen for taking samples the surface is lightly scraped, to remove leaves mulch, &c., a vertical hole 18 inches square is then dug to a depth of 2 feet, like a port hole. With a sharp spade a slice of soil to a depth of one foot is cut off one side of the hole and placed on a clean bag. Big stones and big roots should be removed, but not small stones, the size of a pea, or fine roots.

The process is repeated at the other places selected, and all the samples are then thoroughly mixed, big lumps being broken up. After well mixing about 10 lbs, is placed in a clean canvas bag, which is securely tied up. Such samples should be forwarded in a clean wooden box.

It is important that bags and boxes should be clean.

Care must be taken about the labels. Each sample should be labelled and a duplicate label put inside the bag. Full information should be sent about each sample, stating elevation, rainfall, depth of soil, nature of sub-soil, surrounding rocks and country, whether and is on a level or slope near a river, &c, and the history of the previous manurial treatment of the soil.

The same rules apply to taking samples of a sub-soil

Plant Diseases.

These should be packed so that, if possible, they will arrive in the same condition in which they were collected, and they *must not be externally wet* when they are put up. In some cases the specimens may be dried between sheets of blotting paper under light pressure before they are packed

Specimens which decay rapidly may be sent in a solution of Formalin, 1 part in 20 of water.

Insects.

If live insects are sent, some of their food plant, which should be *dry*, should be enclosed with them, and also a little crushed paper. Insects found in soil, wood, &c., should be sent in these materials

Tin boxes should be used for packing, and holes should not be bored in them, or if they are, only one or two and these quite small.

Insects should usually be sent dead. They may be killed in a cyanide bottle, or enclosed under a tumbler with a small piece of blotting paper soaked in benzene. They should be *quite dry* when packed, and are best buried in dry sawdust with a little powdered naphthaline.

Small insects should be packed with finely shredded paper. *Cotton wool should never be used.*

Butterflies and moths should be enclosed in papers folded into triangular-shaped packets which are packed in a box with crushed paper to prevent shaking.

Scale insects should be packed *quite dry*, each specimen attached to its food plant simply wrapped in soft tissue paper.

General.

In all cases more than one specimen of each kind shou'd be sent, if possible 4 or 5.

Every specimen should be clearly labelled so that there can be no possible mistake. The label should bear a number referring to a description in the covering letter.

Full particulars about all specimens sent must be recorded.

All specimens should be sent to

THE SECRETARY,
The United Planters' Association of Southern India,
BANGALORE,

to ensure their being promptly attended to upon arrival.

The Planters' Chronicle.

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THE U. P. A. S. I.

(INCORPORATED.)

Contents.

The Scientific Department publishes a very interesting article on the mixing of fertilisers, with a practical demonstration by Mr. Birnie, which led to a valuable discussion at the Meeting. It is impossible to over-estimate the value of such personal instruction by experts.

The Proceedings of the West Coast Planters' Association, the South Mysore Planters' Association and the Anamalai Planters' Association are published. They are all of general interest on the question of the proposed Labour Commission. All three Associations have strongly supported the action of the United Planters' Association Meeting.

We congratulate the West Coast Planters' Association on their Resolution (153) resolving to increase their subscription to the U. P. A. S. I. to the 2 anna basis. This brings all the affiliated Associations into line as equal subscribers at 2 annas, which we hope will be noted by the Honorary Secretary of the Anamalai Planters' Association.

We must, before leaving this subject, heartily congratulate Mr. Abbott, the late Chairman, on having his continued efforts towards this culmination accomplished. Coming so soon after a wonderfully unanimous Annual Meeting, over which he presided with much success, we consider this the coping stone of his Chairmanship.

We note with satisfaction that the Anamalai Planters' Association endorsed what their Delegates said at the Annual Meeting as regards the retention of the Scientific Officer for a further period of five years. All the remarks on this subject were laudatory and appreciative, but the Editor is of opinion that the U. P. A. must move and soon if they wish to retain those services which they recognise as becoming more and more valuable, or it will have to start *ab ova usque mala*.

Several interesting letters are published on the subject of the Labour Question, but it would be invidious, where all are so good, to pick out any for special mention; but we trust that Mr. Mead will reply to some of the letters which his own has brought forth.

THE SCIENTIFIC DEPARTMENT, U.P.A.S.I.

THE MIXING OF FERTILISERS ON ESTATES, DISCUSSED AT A MEETING AT POLLIBETTA.

The Scientific Officer has just completed a rapid tour of inspection of the Kalisyndicate Experiment Plots in Coorg. He was accompanied on this tour by Mr. R. Birnie, the Agricultural Officer of the Syndicate, and while at Pollibetta, the opportunity was taken to hold a meeting of an informal nature to discuss with planters the possibility of making fertiliser mixtures on the estates instead of buying such mixtures ready made. When opening the discussion on this subject, Mr. Anstead said :—

During a discussion which took place at the recent Annual Meeting of the U. P. A. S. I. on the subject of fertiliser guarantees it was suggested by Mr. Birnie, the Agricultural Officer in India to the Potash Syndicate, that it would be a good plan if planters were to buy the ingredients of any desired mixture separately on guarantee and mix them in the desired proportions on their estates. They would then be certain of getting any desired mixture as free as possible from impurities

In addition to this the solubility and accompanying availability to the plant of the different plant food in the mixture can be regulated. A mixture may be guaranteed to contain a certain percentage of phosphoric acid and potash ; but these may exist in the mixture in insoluble and slowly available forms. For instance a ground natural phosphatic or potassic rock may give the stated analysis and yet the plant food in it may be unavailable, and therefore the purchaser does not really obtain what he expects.

The only objection that I can see to this procedure is purely one of cost and trouble. As regards the cost it is a simple matter to calculate for any given mixture whether it is worth while to make it on the estate from a monetary point of view.

Take for example a mixture, a sample of which was recently sent me for analysis. guaranteed to contain Nitrogen 6%, Phosphoric Acid 7% and Potash 12%. This cost Rs.156-8 delivered on the estate. The actual value of the plant food in the mixture can be calculated as follows. Suppose that the Nitrogen is all derived from Ground Nut Poonac, its cheapest form, it would cost 8 annas 5 pies per pound. If the Phosphoric Acid is derived from Basic Slag it will cost 2 annas 4 pies per pound and if the Potash is derived from Sulphate of Potash it will cost 2 annas 10 pies per pound. These values are calculated from the catalogue prices of these ingredients and their guaranteed contents.

Now one ton of our mixture contains if up to guarantee—

	Rs.	A.	P.
134'4 lbs. of Nitrogen @ 8 annas 5 pies per pound ...	70	11	0
156'8 lbs. of Phosphoric Acid @ 2 annas 4 pies per lb. ...	22	13	10
268'8 lbs. of Potash @ 2 annas 10 pies per lb. ...	47	9	7

i. e. the plant food in 1 ton costs ... Rs... 141

Hence transport and mixing charges, &c., cost Rs.15-5-7. The cost of transport in this particular case was probably about Rs.10 per ton leaving Rs. 5-5-7 for mixing and it would probably have paid to buy the ingredients separately and mixed them on the estate.

The difficulties of actually doing the mixing are not great and Mr. Birnie will be good enough to give us a demonstration as to how it should be done and you yourselves can then estimate what the cost is likely to be per ton.

Mr. Birnie then gave a practical demonstration by making a mixture of the following fertilisers:—

½ cwt. Muriate Potash.
½ cwt. Basic Slag.
½ cwt. Nitrolim.
½ cwt. Steamed Bone Meal.

He explained that this mixture was chosen not because it was a particularly good one for Coffee but because it might be considered a typical general fertiliser containing a balanced proportion of plant food and it contained two ingredients, Nitrolim and Steamed Bone which were a little troublesome to mix owing to their dusty nature. Mr. Birnie then showed how in making mixtures of this kind the bulkiest manure should be spread out on the floor first in an even layer and then the next bulkiest and so on one at a time spread in layer after layer on the top. When all had been put out in this way a spade was taken and the edges of the heap first thrown up on to the top of the heap. This having been done beginning at one side, the whole heap is turned over on a conical heap formed close by, care being taken to lift each spadeful from the bottom of the heap and turn it over during the process. The process is repeated three times at the end of which it was very apparent that the mixture was complete. It was explained during the course of the demonstration that some manures must not be mixed together at all under any circumstances, such, for instance, as lime or Basic Slag with Sulphate of Ammonia or manures containing Nitrogen. Others again may only be mixed just before they are applied as they have a tendency to cake and become hard, such for instance are Superphosphate and Sulphate of Potash. It was decided by the meeting that the method of mixing demonstrated would cost at the most ten annas per ton.

At the end of this interesting demonstration a long discussion took place dealing with such subjects as the use of manures, cultivation, green bug, leguminous green dressing, and leaf disease, and at 6-30 p. m. a most successful meeting came to a close with a hearty vote of thanks to Mr. Birnie and Mr. Anstead to which those officers briefly replied in suitable terms.

The Scientific Officer.—Mr. Anstead left Bangalore on 15th October to make a tour of the Rubber and Tea District on the West Coast belonging to the West Coast Planters' Association, Mundakayam Planters' Association, Peermade Planters' Association, and South Travancore Planters' Association. He expects to reach Mundakayam about the 1st of November, Peermade about 10th and Quilon about 20th November and to be back at head-quarters early in December, after which he will attend the meeting of the Board of Agriculture to be held at Coimbatore beginning on 8th December. Letters should be addressed to Mr. Anstead at Bangalore as usual and they will be forwarded to him at convenient centres while he is on tour, but some delay in replies must be expected under the circumstances. Members of the District Associations mentioned above who wish to see Mr. Anstead during his tour should communicate with their local Honorary Secretaries as soon as possible.

R. D. A.

DISTRICT PLANTERS' ASSOCIATIONS.

West Coast Planters' Association

Proceedings of a General Meeting held at Malabar Club, Calicut, on 3rd October, 1913.

PRESENT.—Cochin Rubber Co. per Mr. R. de Roos Norman; Eddivanna Rubber and Tea Co. per Mr. A. P. Kinloch; Kerala Rubber Co. per Mr. Campbell Hunt; Malayalam and Rubber Produce Co. per Mr. A. C. Morrell; Mooply Valley Rubber Co. per Mr. A. H. Mead; Pudukad Rubber Co, per Mr. H. C. Plowden; Thodupuzha Rubber Co, per Mr. C. F. Ewart; Central Malabar Syndicate per proxy; Periyar Rubber Co. per proxy; Pullangode Rubber Estate per Mr. H. Waddington (Honorary Secretary), Messrs. C. E. M. Browne, J. Dell, J. Harding Pascoe. *By Proxy*:—Messrs. E. F. Barber, W. L. Crawford, C. Lake, and L. F. Scholfield. *Visitors*:—Messrs. H. Browne, R. H. Crowther and A. H. Robb of the Malabar Branch Association and Messrs, J. G. Ferguson and Templeton Wright. *Chairman*:—Mr. Campbell Hunt.

The Proceedings of the last Meeting were confirmed.

136. *Rules.*—The following alterations were carried unanimously—Words "Not already having a vote as representative for an estate subscription" were inserted between words "Person" and "Duly" in Rule II. Words "If planters within the jurisdiction of the West Coast Planters' Association" were inserted between words "Must" and "Be" in Rule XVIII.

137. *New Members*.—Election of Messrs. C. E. M. Browne and E. H. Cooper and joining of Mr. E. H. Hallley as representing Mooply and Pattingal Estates of the Mooply Valley Rubber Company, were recorded.

138. *New Branches—Malabar Branch.*—This under the title of the "Malabar Planters' Association" was accepted as an affiliated Association and recognised Branch.

Read letter from Mr. Morrell advising that members in Travancore hope to start a Branch in the immediate future. Recorded with satisfaction and Mr. Morrell was asked to convey assurance of a hearty welcome to his neighbours.

139. *Rubber Theft Act.*—The Honorary Secretary reported that with the assistance of Mr. Martin, he secured a copy of the Act brought into force in Travancore on 12th June, 1912, being Regulation IX of 1087. Section 16 of this reads as follows:—

"Any person who is found in possession or charge of any rubber or wet rubber which is suspected to have been stolen, may be charged with being in possession of rubber which is reasonably suspected of having been stolen, and if such person does not give an account to the satisfaction of the Magistrate as to how he came by such rubber or wet rubber, and the Magistrate is satisfied that, having regard to all the circumstances of the case, there are reasonable grounds for suspecting such rubber or wet rubber to have been stolen, such person may be convicted of an offence under this regulation."

Read letter from Honorary Secretary to the Dewan of Cochin and his reply advising that, "It is under contemplation of the Durbar to pass a Regulation as regards Rubber Dealers in the Cochin State, similar to Travancore Regulation dated 12—6—1912."

Resolved that the Cochin Branch be asked to press the matter of the passing of such a regulation in Cochin and that the Honorary Secretary's request to the Hon'ble Mr E F. Barber not to press the point with the Government of Madras until this Association advises him further to be confirmed.

140. *Contracts between Magistrate and Coolies Act XIII of '59.*—The Honorary Secretary reported that the District Magistrate of Malabar has ruled that maistries can lay complaints and obtain warrants in cases where they are the employer and have entered into contracts with labourers.—Recorded.

Attention of members was called to the necessity, in cases where they sent an assistant to take out processes under Act XIII of '59, of giving a written authority to act, to such assistants.

142. *Claim made by Mr. C L. Ittiachen.*—Recorded that the Cochin Branch are settling this matter.

143. *Finance.*—Accounts for year closed to 15th September, with Balance Sheet to same date, showing an available balance of Rs.942-4-0 and a Provisional Budget for remaining three months of 1913 showing an estimated expenditure of Rs.575-5-0 were laid on the table.—Recorded.

144. *Customs Duty.*—Read letter dated 5th August, from the Central Travancore, asking support to resolution that Excise Commissioner be requested to accept Coast Agent's certificates as a guarantee against import of dutiable goods and evading of correct dues.

In the opinion of this meeting it would be impossible for Government to grant the concession asked for.

145. *United Planters' Association of Southern India—Report of Delegates.*—Resolved as this has already been circulated to all members it was not considered necessary to have the same printed, but the Honorary Secretary was asked to file a copy with proceedings of this Meeting.

A very cordial vote of thanks was passed to Messrs. Campbell Hunt and H. Waddington for their work at Bangalore.

147. *Proposed Labour Commission.*—Proposed by Mr. H. C. Plowden and seconded by Mr. C. F. Ewart, that a similar resolution to that passed by the Wynaad and Nilgiri Associations be passed. 6 members voted for and two against. Not being unanimous the following was carried:—That this Meeting considers the institution of a Labour Commission for Southern India an urgent necessity and that the members present agree to represent the position to their proprietors, recommending them to allow the Estates in their charge to join the scheme if it is found that the promises of support justify the establishment of a Commission on the lines suggested in the report of the Committee appointed by the U. P. A. S. I.

Thirteen members voting for and two against. On a poll being called for, it was found 59 votes were for and 47 against.—*Carried.*

148. *European Defence Association.*—Read U. P. A. S. I. Resolution and circular 13/13. Honorary Secretary informed the meeting that 18

members of this Association and its branches had joined so far. 10 gentlemen present at the Meeting intimated their wish to become members and the Honorary Secretary was instructed to send in their names.

149. *London School of Tropical Medicine.*—Proposed by Mr. Mead and carried that this Association endorses the resolution passed by the U. P. A. S. I., and the Honorary Secretary was instructed to forward a cheque for £10 to Messrs. Harrisons and Crosfield as its donation to the Fund.

150 *Rubber Exhibition, 1914.*—What support will be forthcoming from this Association being still undertaken until replies are received from Directorate of different companies, the Honorary Secretary was instructed to advise Mr. J. A. Richardson of the position at date.

151. *Curtailment of Advances.*—Read resolution passed at the Bangalore Conference of the U. P. A. S. I.

152. *Bulletins.*—Resolved that the Honorary Secretary be instructed to forward Rs.30 to the Secretary U.P.A.S.I. as an advance for Bulletins and request that he be furnished with 50 copies of all issued, for circulation to all members of this Association and their assistants.

153. *Increase of Subscription to U. P. A. S I.*—Resolved that this Association subscribe to the U. P A. S. I. Funds at the same rate as other affiliated Associations, namely, 2 annas per acre cultivated, and that a special additional subscription at 6 pies per acre be collected now to meet the amount required for the half year 1st July to 31st December, 1913. But it strongly deprecates the further enhancement of subscription and considers the present rate is ample for efficient working of the U. P. A. S. I.

154. *Delegates' Expenses.*—The Honorary Secretary was instructed to pay Messrs. Hunt and Waddington Rs.100 each on account of their expenses in representing the Association at Bangalore.

155. *Visit of Board of Agriculture.*—A member having intimated his wish for further details, the Honorary Secretary was asked to advise the Secretary of the U. P. A. S. I.

156. *Tour of Scientific Officer.*—Members having asked that Mr. Anstead should visit their estates during his coming tour, the Honorary Secretary was asked to inform him and arrange details of tour.

A vote of thanks was passed to the Honorary Secretary and members of the Malabar Club for granting the Association a room for the purpose of this meeting.

With a vote of thanks to the Chair, the Meeting terminated.

CAMPBELL HUNT,
Chairman.

H. WADDINGTON,
Honorary Secretary

South Mysore Planters' Association.

Minutes of Special General Meeting held at Chickanhulli, on September 26th, 1913.

PRESENT.—Messrs. W. L. Crawford (President), C. J. Hayward, A. Thomson, D. Jackson, S. Sladden, J. G. Hamilton, H. F. Anderson, W. F. Scholfield, C. K. Pittock, C. Lake, St. J. Hunt, P. Hunt, K. Tammiah, M. J. Woodbridge (Honorary Secretary). *Visitor:* C. A. King.

The Minutes of the last 2 Special General Meetings were confirmed, and the result of the referendum as to the introduction of an Act similar to Act I of 1903 into Mysore was announced. The result being 18 in favour of and 7 against.

Report of Delegates to U. P. A.—Mr. Crawford read the report of the delegates which was as follows:—

The matters chiefly interesting this Association were as follows: –

Arsikere-Mangalore Railway.—We understand everything points to the early sanction of this long advocated and essential line. We were informed that the Mysore Government and the District Board of South Canara were most anxious for its early construction, and that the Madras and also the Government of India approved of it, and all that remained was the formal sanction of the Railway Board.

European Defence Association.—This is a matter chiefly for the consideration of private members and for them to consider the advantages offered by joining.

School of Tropical Medicine.—This is also a matter that chiefly concerns the private member. Some Associations in Southern India are giving fairly large donations from Association Funds, but we are of opinion that as Tropical Diseases are so general, and widespread, we would prefer to see the Imperial and the Government of India doing more in the matter and not leaving it to private enterprise.

Labour.—As this is a matter that will come up later on in the Agenda we will say nothing about it at present, except that we were able to carry out our instructions almost to the letter, having been told to support any suggestions of a Commission to look after our interests and help to retain the labour we have.

Pest Act.—You will all, doubtless, have read Dr. Coleman's interesting lecture on this subject and it is not necessary for us to say more except that we had an interview with the Dewan of Mysore, who was sympathetic, and we believe interested in the matter, and who promised to give the subject his consideration.

Scientific Officer.—Your Delegates agreed to continue our subscription and so did all the other subscribing Associations. We also urged the necessity there was to re-appoint Mr. Anstead to this work for a further period as the value of his services was recognised. We also, as strongly as possible, supported the suggestion that the U P. A. Scientific Staff should be strengthened by the addition of a Mycologist, and to our mind there is little doubt Government will help us in this matter if we are prepared to meet part of the expense and this does not seem unreasonable. It is, however, for the United Planters' Association to decide it they are in a position to do so without calling upon District Associations for further funds. Personally we are of opinion a workable scheme acceptable to the Government of Madras could be drawn up.

Hybridization.—The experimental plot we understand has been planted and the plants are coming on well.

Agricultural matters.—It is unnecessary to say anything on this subject, as what was done at the meeting has been fully reported. We note with satisfaction that the Imperial Board of Agriculture will visit the Madras Presidency this coming cold weather and the U. P. A. hope to have the pleasure of taking them to see one or more of the Planting Districts of Southern India, so that they may get a first-hand impression of the magnitude of the Planting Industry in South India. After a few questions had been asked and answered by the Delegates, the following resolution was proposed by Mr. Pittock and seconded by Mr. J. G. Hamilton and carried :—

" That the Scientific Department of the U. P. A. be asked to arrange for experiments with Dynamite in relation to soil breaking being carried out by the Assistant Scientific Officer in this District and that Messrs. Parry & Co. be asked to give the explosives for experiment free."

A vote of thanks to the Delegates was passed.

Instructions to Delegate to Dussera Representative Assembly.—After considerable discussion instructions were given on two subjects of importance to Mysore planters.

Proposed Labour Commission for Southern India.—This subject was introduced by the Chairman as follows:—For many years the best brains of the planting Community of Southern India have been endeavouring to devise some useful, practical and workable scheme to help us to surmount some of the worst of our labour troubles, and at last, not a day too soon, the United Planters' Association have through their Labour Committee recommended the adoption by the whole of the planters of Southern India, and have published a most interesting and valuable report clearly stating how such a Labour Commission can be established. A copy of the report has been sent to every member of this Association.

The proposed Labour Commission has almost everything in its favour, and practically, except the considerable cost, nothing against it. The question of its cost is of course a vital one, but if we are to have a Labour Commission of our own and derive the benefit we hope to from its successful working it will be cheap at Rupee 1 per acre, and it must never be forgotten that anything that is really good and worth having always costs money. To try and run a Labour Commission for Southern India " on the cheap " is to foredoom the whole scheme to failure. We must get the services of the very best men available for the work of organisation and inspection, and a thoroughly good subordinate staff, and you cannot hope to get either one or the other without paying well for it. I am of opinion if the cost can in any way be kept at not more than Re.1 per acre, and if all the Estates in Southern India join the scheme it can very easily be arranged so as not to exceed that figure, everyone will join or at any rate should do so, and so make the Labour Commission for Southern India an organisation of the greatest help and assistance to us.

I hear that there are established in South Canara, where the bulk of our labour comes from, representatives of almost every cooly importing country outside of India to say nothing of Ceylon and Southern India recruiters, and the Railway have conceded special cheap fares for parties of coolies leaving Mangalore for other parts of India, many of them doubtless owing us or our maistries money. If we are to continue to get coolies or even keep those we have, something must be done and done quickly or we shall find it too late.

Mr. J. G. Hamilton then explained how the Commission would work, and what he thought they would undertake to do, laying special emphasis on the point that they would not recruit labour, but that Estates must send their own maistries who would receive help and be looked after by the Commission as far as possible. A long and animated discussion then took place during which several suggestions for the working of the Commission were made.

The following resolution was then carried unanimously:—

"That this Association is in agreement with the proposal to introduce a Labour Commission on the lines recommended in the Labour Committee's report and strongly recommend every planter in Mysore to join the scheme and send in a list of their subscribing acreage."

Mr. J. G. Hamilton was elected Delegate to attend the special general meeting of the U. P. A. and a Sub-Committee consisting of the President, Secretary, Mr. J. G. Hamilton, Mr. C. K. Pittock and Mr. C. J. Hayward were appointed to go into the suggestions made during the discussion. Members present at the meeting promised to place 2,419 acres on the Commission and to recommend proprietors at home to agree to join the Commission at an as early date as possible.

Address to Viceroy—Proposed by Mr. J. G. Hamilton and seconded by Mr. H. F. Anderson:—

"That the President and Honorary Secretary do represent the South Mysore Planters' Association in presenting our address to His Excellency the Viceroy."

Co-operation in purchase of manure.—Owing to no scheme having been formulated and such facts and figures as have been obtained not being available at the meeting, only a short discussion took place and the subject was postponed till the next meeting after the following resolution had been carried:—

Proposed by Mr. A. Thomson, and seconded by Mr. C. K. Pittock: "That Manure firms in India be approached to see what rebate they would be prepared to give on quantities of manures ordered (in bulk) through them by the Association."

Proposed by Mr. W. L. Crawford and seconded by Mr. A. Thomson: That Messrs. C. K. Pittock, M. J. Woodbridge and G. N. Frattini with power to add to their number be asked to draw up a scheme for the co-operative purchase of manures through the South Mysore Planters' Association."

Mysore Economic Conference.—Read Deputy Commissioner's letter No. 117/9D. E. C. with enclosed copy of proceedings of the Hassan District Committee, Economic Conference, and Mr. K. Thammiah's letter to the President of the Hassan District Committee.

Resolved that the manufacture of artificial manure in the State is possible. Government should, however, purchase quantities of artificial fertilisers and sell the same to Ryots and others at cost price and that the establishment of lime works in Mysore is very necessary and desirable.

Roads:—Mr. Crawford spoke on the subject of roads as follows :—

I would like to state that as far as Munjarabad is concerned I have noted with satisfaction that an attempt is at last being made to spend some money on the roads in an intelligent manner; but as the side drains and in many cases the road surface has been so persistently neglected and the annual allotment wasted, it will take time to put the roads into good order.

It is, however, gratifying to find as I have already said that some work is really being done at last ; but I notice in spite of all representations in places no attempt has been made to clean our drains.

The Honorary Secretary was instructed to write to the Executive Engineer, Kadur, calling his attention to the fact that metal is frequently spread on the roads and then left uncovered for a long time.

Election of Members of the Council of Mysore Planters' Associations :—This gave rise to a long and somewhat heated debate on the subject of the constitution of the Council and how best to secure its efficiency and continuity of policy.

After a rather drastic proposal by Mr. C. K. Pittock had been withdrawn, Mr. Hamilton proposed and Mr. Jackson seconded : " That the present system of election to the Council of the Mysore Planters' Association does not ensure the best service and that it is advisable that members should take office for three years instead of one. Carried 6 to 2, several members not voting. Mr. J. G. Hamilton and Mr. C. Lake were elected members of the Council for the South Mysore Planters' Association.

Association Jubilee.—Resolved that Rule 5 be suspended so as to enable the Jubilee Annual Meeting to be held in Saklaspur.

The proceedings terminated with a hearty vote of thanks to Mr. Hayward for his hospitality.

M. J. WOODBRIDGE,
Honorary Secretary.

Anamalai Planters' Association.

Proceedings of a General Meeting of the Anamalai Planters' Association, held at the Valparai Bungalow, at 10 a.m., on the 28th of September, 1913.

PRESENT.--Mr. Geo. L. Duncan (Chairman), and Messrs. deSalis, Walsh, Howland, Jeffrey, Cotton, Brierley, Fowke, Ireland-Jones, Emery, Robb, Sampson, Congreve and J. Hatton Robinson (Honorary Secretary). *By Proxy*: Mr. E. W. Simcock.

AGENDA.

1. To confirm Minutes of last General Meeting held at Valparai and of last Committee Meeting held at Monica.
2. U. P. A. S. I. Delegate's Address.
3. LABOUR—(*a*) Proposed U. P. A. S. I. Labour Commission.
   (*b*) The Madras Planters' Act of 1903 being extended to this District.
4. Postal and Telegraph affairs.
5. Medical.

6. Public Bazaar for the District.

(1) The Minutes of the General Meeting held on 25—7—1913, and of the Committee Meeting held on 10—8—1913 were confirmed.

(2) U. P. A S. I. DELEGATE'S REPORT.—Mr. Congreve read the following Report:—

Owing to other demands on their space Newspaper reports of the Conference were not as full as usual, a considerable amount that was of interest being omitted, and it is therefore important that the book of proceedings should be secured and carefully read.

The meeting opened on the morning of the 25th ultimo, the forenoon being taken up in Committee to arrange in what order the Agenda paper should be taken, etc., the afternoon was given up to the various reports and addresses which were fully reported and do not call for comment.

LABOUR.—It was at once recognised that labour was the all-important question; the unanimity on this subject was remarkable and a whole day was allotted for discussion.

The meeting first heard the report of the Sub-Committee appointed last year to go into the matter, and approved their suggestions. The question of the abolition of the professional recruiter gave rise to a long discussion as it was very difficult to define this unscrupulous gentleman, so as to protect the genuine Maistry from being harassed in his recruiting work by any action which Government may be induced to take to put a stop to prevent abuses.

The resolution finally adopted was as published, and it remains to be seen if Government will assist to this extent.

There seemed to be a strong feeling amongst all the Delegates that the time had come when some concerted action was absolutely necessary to protect our interests in the very keen and ever growing competition with other countries. It was felt that Government legislation was neither possible nor advisable, and that any scheme or registration would be too complicated to work satisfactorily.

It was agreed that a well-organised Labour Commission would be the best means of attaining our object, and accordingly a Sub-Committee of 7 Delegates (your Association being represented thereon) was appointed to go into the whole matter and draw up an estimate. A copy of this report has been circulated and, although it is not perhaps as full as might be desired, it must be remembered that time was limited; Delegates evidently realised this by the manner in which the draft scheme was received when read in open meeting.

Your Delegates were as you will remember, given very definite instructions to press for some united action with regard to Labour and to confirm the action of, and follow the course laid down by your Delegates last year. They were also instructed to back up any scheme tending towards combined action and they therefore informed the meeting that this Association was practically certain to support the Labour Commission, and it now remains for you to confirm this.

Support was guaranteed in several quarters, Mr. Mahon promising to bring in 10,000 acres. The Chairman and Mr. Hamilton agreed to support the scheme as far as the acreage under their control was concerned, and Mr. Richardson, although he already has his own recruiting establishment, also promised support. Altogether we believe the Chairman said that support was practically assured from some 35,000 acres, With a start like this it looks as if these yearly recurring discussions were to bear fruit at last.

Mr. Scoble Nicholson, head of the Ceylon Labour Commission, was present during the meeting and most courteously informed us as to the cost of running this well-organised commission and replied to various questions as to detail in a manner which made one realise how possible it is to work in harmony with our more pushing brethren across the Straits.

He said he was sure the Ceylon planters would welcome a South Indian Labour Commission, and felt sure it would prove of inestimable benefit to all.

It was intimated that the Kanan Devans, who already have their own well-organised Commission, might join in the general scheme as soon as this was put on a satisfactory footing.

AGRICULTURE.—On the third day of the meeting several addresses were given on agricultural matters, all of which were most interesting and instructive. The question of manures was brought up and your Association's resolution with regard to excessive amount of sand in Fish manure was passed unanimously, and it is to be hoped this will have some effect and result in a more satisfactory sample of that fertiliser being supplied.

Mr. Anstead has some interesting analysis of Fish manure, copy of which is appended for your information.

THEFTS OF PRODUCTS.—Your Delegates gave notice that they wished cardamoms included in a resolution brought forward by the West Coast Associations in connection with thefts of Rubber, but subsequently withdrew this as it was pointed out that there was very good reason to believe that something might be done in this respect if Rubber were taken alone, whereas, if other products were tacked on, there was practically no chance of Government moving in the matter. Coorg also agreed to withdraw Tea and Pepper.

CEARA RUBBER.—Mr. Mahon gave some very useful information as to his experiences in Coorg and anyone interested in this variety of Rubber would do well to read his remarks in the book of Proceedings.

RETENTION OF SCIENTIFIC OFFICER.—A somewhat heated discussion took place in Committee as to whether Delegates were satisfied with what was being done. The Chairman asked several times for anyone who had a grievance to give expression to it there. One Delegate took up the challenge, stating that he did not consider results from this Department had been very definite so far. However, the feeling of the meeting was that Mr. Anstead had done all that was possible under the circumstances, and it was agreed that no better man than our present officer could be got, and Government is to be asked to retain his services on behalf of the Planting Industry for a further period of 5 years.

You of course know that your Association has never been very enthusiastic over the Scientific Department, but were prepared to continue to support this, provided the Labour Question took first place in the U.P.A.S.I. programme. We feel sure, however, that we are steadily, if slowly, gaining much valuable information through the work of this department, and, as time goes on, we are likely to find more marked and direct benefit therefrom.

CINCHONA.—Your Delegates brought forward a resolution deprecating the opening up of land by Government under this product in our district. This was supported by the Kanan Devans and Nilgiris and carried.

PLANTERS' BENEVOLENT FUND.—Some discussion took place as to the advisability of permitting Eurasian gentlemen to join the Fund at the discretion of the Committee. It appears that one or two such were admitted, notwithstanding the original rule which reads "Proprietors and European Managers and Assistants." It would be almost impossible to return these gentlemen their subscriptions, and it was, therefore, agreed, to obviate this, that under certain circumstances and at the discretion of the Committee this might be allowed. This right we feel sure will be very carefully used, but it would probably be advisable to have the question gone into at the next meeting of the U. P. A. S. I. when Delegates would have definite instructions.

FINANCE AND SUBSCRIPTIONS.—As the meeting was agreed on the Labour Question your Delegates considered they were permitted to promise the continuation of the present subscription to the Parent Association on the 2 anna basis and gave notice accordingly.

The Mundakayam Association agreed to pay the enhanced subscription, so now there are only two Associations that do not subscribe at the two anna rate.

Mr. Robinson proposed a hearty vote of thanks to Messrs. Duncan and Congreve for their work and that their report be adopted and printed with the Proceedings of the Meeting—and that each of the Delegates be voted Rs.15 a day towards their expenses during the time they were away attending the U. P. A. S. I. Meeting. This was seconded by Mr. de Salis.

An amendment proposed by Mr. A. A, Robb and seconded by Mr. C. R. T. Congreve: "That the *actual* expenses incurred by the Delegates be paid them." This had not the support of the Meeting and Mr. Robinson's resolution was carried.

(3) (*a*) PROPOSED U. P. A. S. I. LABOUR COMMISSION.—It gave the Meeting great pleasure to know that united action about the Labour Question was at last likely to be taken up by the U. P. A. S. I. and the following resolution was unanimously passed:—

"That the Members of this Association unanimously agree as to the *absolute necessity* of a Labour Commission, on the lines drawn up at the late U. P. A. S. I. Meeting, and have strongly recommended the adoption of the same to the Managing Agents of the Companies interested."

10,000 acres were voted as ready to join the Commission subject to the sanction of the Directors at Home.

(*b*) THE MADRAS PLANTERS' ACT OF 1903—BEING EXTENDED TO THE DISTRICT.—Correspondence from the Hon'ble Mr. E. F. Barber was read.

The Honorary Secretary was requested to refer Government to proceedings of the Extraordinary General Meeting held at Puthototam on 1/1/1904—when the resolution then passed read :—

"That Government be asked to apply the Labour Act I of 1903 to this District tentatively."

(4) POSTAL AND TELEGRAPH AFFAIRS.—Read copy of correspondence from the Postmaster-General, Madras, to the Superintendent of Post Offices,

Nilgiri Division, and the Hon'ble Mr. E. F. Barber's letter of 8/9/13 to the Hony. Secretary, Anamalai Planters' Association.

As Government had asked the Association to build a Post Office, and had sent a copy of Plan "A" of a standard building estimated by the Executive Engineer, Coimbatore, to cost Rs.5,300, the Hony. Secretary was asked to write to Government and ask what yearly rent they would be prepared to pay, and also to ask for a detailed plan and specification.

The Association suggested a timber building with Iron roof.

Correspondence was read regarding the proposed Telegraph guarantee.

The Meeting, with one exception, was in favour of the Telegraph line being brought up into the District. It was noted that Messrs. James Finlay & Co., were prepared to pay their share of the guarantee.

(5) MEDICAL.—The Honorary Secretary was requested to write and say that the District had been left without a Medical man—and that one should be sent at once.

(6) PUBLIC BAZAAR FOR THE DISTRICT.—The District Forest Officer's letter No. 321 of 13 was read, The Hony. Secretary was requested to write urging that the matter should not be delayed if work was to be done this year.

On the table U. P. A. S. I. Circulars Nos. 13/13 and 13/14 and correspondence *re.* Cinchona.

With a vote of thanks to the Chairman the Proceedings concluded.

GEO. L. DUNCAN,
Chairman.
J. HATTON ROBINSON,
Hony. Secretary.

CORRESPONDENCE.

Srivilliputtur,

THE EDITOR,
The Planters' Chronicle.

Sir,—Owing to the exigencies of my life, I did not see your issue of the 27th September till to-day. I only write to say something about the remarks of Mr. Mead where my own name is mentioned. I think it was in 1910 or 1911 that Government point blank refused to do anything to help us in the way of securing fair competition or of protecting the interests of the emigrant cooly. At the U. P. A. S. I. Meeting of 1911, I publicly recanted and made a disavowal of my former position on this subject, but said "*I still think that where coolies are unjustly treated in British colonies or in other countries the Government should step in and see that fair dealing is meted out to them and that promises made or implied are kept.*" (page 93 Book of Proceedings 1911). It is notorious that promises made or implied have not been kept, and Mr. Mead points out that further breaches of promise are being discussed in Malaya.

I notice Mr. Mead says that each district has *more or less* its own centres of recruiting, and wants me to bear him out in this statement, I can only do so if he consents to add the words "*especially less.*" During the enquiries into this subject which I carried out for the U. P. A. S. I., the Secretaries of the various daughter Associations kindly supplied me with valuable information. It will be remembered that I issued to them skeleton maps, on which they marked with red the position of the planting district concerned and with blue the position of those parts of the country from which their labour was drawn. The fact came out prominently that the recruiting areas not only overlapped but were often identical. It is true, however, that each district or group of districts (such as the Mysore and Coorg districts, Nilgiris and Wynaad, and the Travancore districts) have certain recruiting centres where they predominate, but nevertheless have to suffer the torturing pin-pricks of outsiders. As an instance, I ask you to look at any map of South India. Take only that part of the Peninsula South of the town of Madura. The Tamil recruiting area is bounded by the Mountains (Western Ghauts) on the West and the Sea on the East. The country east of the Railway is practically monopolised by Ceylon. In the small remaining area there are three organized Labour Departments, besides sporadic Agencies of individual groups of Estates. Two of these Departments have Europeans at their head, who content themselves by wishing each other in Jericho. One with an Indian Superintendent is more unscrupulous, and the sporadic Agencies are covertly piratical, quite against the wishes of the Estates they serve. They all suffer from competition with Ceylon and the Straits. Ceylon has every right on its side, for coolies from parts of this area have worked in Ceylon from ancient times. The Straits are new comers, and are there by *force majeure*. All the South India Agencies spend far more because they are divided, than if they were all under one control. I am adopting fictitious figures when I say, that between them they spend a lakh of rupees a year, whereas if all were combined the expenditure need not be more than Rs.75,000, a saving of 25%. A more efficient service would conceivably be secured, as there would be some chance of regulating advances and of introducing discipline among kanganies, which at present is impossible. I dread, therefore, the adoption by each district of a plan for running its own small Commission as Mr. Mead suggests. Sir, I must have exhausted your patience, and at any rate I have exhausted the time at my disposal.

Yours faithfully,
AYLMER MARTIN.

THE EDITOR,
The Planters' Chronicle.

Sir,—I have read Mr. Mead's letter in your issue of 27th ultimo with interest, but I had no intention of answering it, or any point in it, and would not take up my pen now, had I not received a letter from a brother planter expressing views somewhat similar to Mr. Mead's on the question of District Commissions as against a Combined Commission.

There is no need to question any of Mr. Mead's facts and statements, for they are all overshadowed by one huge fallacy, which, in my opinion, invalidates the whole of his suggestions.

Can Mr. Mead give any instance where the efforts of individuals or of small bodies of individuals have prevailed against combined organisation?

Perhaps he can, I confess I cannot, and the instances to the country which I can find in the history of my own country, in Æsop's Fables, and in the Bible, are good enough for me.

If we can admit that our competitors have organizations, We must admit that it is only by combination, and the resulting organisation, that we can hope to bring ourselves to their level.

Yours faithfully,
E. F. BARBER,

Ootacamund, 4th October, 1913.

6th October, 1913.

THE EDITOR,
Planters' Chronicle,
Bangalore.

Dear Sir,—Mr. Mead's letter in your issue No. 39 appears to call for some comment and I venture to submit a few remarks on the various points he touches on.

Legislation.—While not offering an opinion either for or against legislation, I think if we substituted *combination* for it, it would be more to our advantage. We are all agreed that combination is most desirable yet apparently make no effort to effect it and still continue in the good or rather bad old way. Correspondence can do something towards effecting more unanimity of opinion but not much, and far more desirable results can be obtained by more frequent personal intercourse and interchange of ideas either direct (in which case the possibilities are restricted) or through an intermediary in the form of a Travelling Assistant Secretary, a subject which has already been ventilated in your pages.

Shortage of Labour.—To talk of shortage of labour in a peninsula populated by teeming millions the vast majority of whom obtain their livelihood in agricultural pursuits is an anomaly. The difficulties in *providing* labour for 200,000 acres is due, in the writer's opinion, to want of combination and system and ignorance of the country and its inhabitants on the part of the employers.

Labour Commission.—Your remarks that Mr. Mead's views are too parochial are quite true. District Commissions are certain to prove more expensive, or in the alternative less effective than a central Commission embracing the whole area and the *Prima facie* objections to half-a-dozen bodies each working independently and more or less in the same area are many. Regarding the objections to the 14 benefits which the Labour Commission hope to confer on us I do not propose to deal with them in detail. A suggestion made in your paper that the Commission should be formed into a Limited Liability Company and estates charged for what they get in the shape of Labour meets them all.

The final suggestion which you characterise as a red herring drawn across the labour trail I am dealing with in a separate letter which is enclosed.

Yours faithfully,
"MUNDERI".

6th October, 1913.

THE EDITOR,
Planters' Chronicle,
Bangalore.

Dear Sir,—Mr. Mead's final suggestion in your issue of the 27th September is one which ought to commend itself to every planter, for it contains a principle essential to our successful progress. Mr. Mead does not go into details, and I foresee a difficulty which, however, can be overcome.

A Committee or any body to be effective must meet frequently and be fully attended, but if the members are to be drawn from all points of the compass neither the one nor the other will be attained and therefore some modification of the proposal in the shape of Sub-Committees for each District appears necessary.

Mr. Mead has, however, made the suggestion and it is now "up to him" to get it beyond the talking stage by circularising and sounding the planters in his District, and also approaching representative planters in other Districts to initiate proceedings in their Districts.

Yours faithfully,

"MUNDERI".

Re: The Proposed Labour Commission.

With reference to the Editor's remark that letters would carry more weight if signed instead of bearing only a nom-de-plume or initials, I would like to point out (1) that a criticism should not depend on the position of its writer to carry weight and (2) that it is hardly diplomatic to disagree publicly with a movement which is popular with V. A's and Managers, and that doing so might place one in the position of Kipling's Boenerges Blitzen "who could write" and as a result found "promotion did not come to him" and his leave "strangely hard to win," if nothing worse happened.

Even if Government put us on the same footing with our competitors and we get all the labour we require, I think a Labour Commission (would not "Agency" be a better name for it) run as suggested by Mr. Barnard would be an excellent thing as we should have some one from whom we could make enquiries regarding the status of m istries, the whereabouts of defaulters, etc. This agency or Commission would presumably employ respectable men who knew some particular district or part of it and who could be relied on (to some extent) to get the information required. This Labour Agency, Limited, would take good care not to start on too lavish a scale and to increase its staff as demands required. It is to be presumed that every District Association would have a say in the management and would take care that work given by Directors or large shareholders would not receive better or prompter attention than that sent by small shareholders.

It has been pointed out to me that Government is never likely to do anything which might curtail emigration because the smaller the population the less chance there is of famine, and if by any chance there was a famine that it is more easily dealt with; also that a non-increasing population means less work and the same pay to all officials whatever else happens. I believe many statistics were put before Government within the last 2 years showing shortage of labour for mills and many other industries with no result. If emigration was curtailed all industries would have sufficient labour and any surplus would have to cultivate and so reduce prices of food-stuffs, but it would mean more work for officials until Government had been made to realise that more were needed. I am informed that the shortage of food-stuffs is due to the cultivator having found that it pays better to grow cotton, indigo, etc., or work on estates.

N. I. K.

How to take Samples and send Specimens for Examination.

Soils.

To obtain a fair average sample of the soil in a field for analysis, as nearly as possible equal quantities of soil are taken from not less than, four different parts of it. At the places chosen for taking samples the surface is lightly scraped, to remove leaves mulch, &c., a vertical hole 18 inches square is then dug to a depth of 2 feet, like a port hole. With a sharp spade a slice of soil to a depth of one foot is cut off one side of the hole and placed on a clean bag. Big stones and big roots should be removed, but not small stones, the size of a pea, or fine roots.

The process is repeated at the other places selected, and all the samples are then thoroughly mixed, big lumps being broken up. After well mixing about 10 lbs is placed in a clean canvas bag, which is securely tied up. Such samples should be forwarded in a clean wooden box.

It is important that bags and boxes should be clean.

Care must be taken about the labels. Each sample should be labelled and a duplicate label put inside the bag. Full information should be sent about each sample, stating elevation, rainfall, depth of soil, nature of subsoil, surrounding rocks and country, whether and is on a level or slope near a river, &c , and the history of the previous manurial treatment of the soil.

The same rules apply to taking samples of a sub-soil

Plant Diseases.

These should be packed so that, if possible, they will arrive in the same condition in which they were collected, and they *must not be externally wet* when they are put up. In some cases the specimens may be dried between sheets of blotting paper under light pressure before they are packed.

Specimens which decay rapidly may be sent in a solution of Formalin, 1 part in 20 of water.

Insects.

If live insects are sent, some of their food plant, which should be *dry*, should be enclosed with them, and also a little crushed paper. Insects found in soil, wood, &c., should be sent in these materials

Tin boxes should be used for packing, and holes should not be bored in them, or if they are, only one or two and these quite small.

Insects should usually be sent dead. They may be killed in a cyanide bottle, or enclosed under a tumbler with a small piece of blotting paper soaked in benzene. They should be *quite dry* when packed, and are best buried in dry sawdust with a little powdered naphthaline.

Small insects should be packed with finely shredded paper. *Cotton wool should never be used.*

Butterflies and moths should be enclosed in papers folded into triangular-shaped packets which are packed in a box with crushed paper to prevent shaking.

Scale insects should be packed *quite dry*, each specimen attached to its food plant simply wrapped in soft tissue paper.

General.

In all cases more than one specimen of each kind should be sent, if possible 4 or 5.

Every specimen should be clearly labelled so that there can be no possible mistake. The label should bear a number referring to a description in the covering letter.

Full particulars about all specimens sent must be recorded.

All specimens should be sent to

THE SECRETARY,
The United Planters' Association of Southern India,
BANGALORE;

to ensure their being promptly attended to upon arrival.

The Planters' Chronicle.

RECOGNISED AS THE OFFICIAL ORGAN OF THE U. P. A. S. I., INCORPORATED.

(Secretary's Registered Telegraphic Address "Planting," Bangalore.)

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THE U. P. A. S. I.

(INCORPORATED.)

Contents.

The different methods of the preservation of Cattle manure, and their results will be read with interest by those who have followed much the same experiments published in the *Chronicle* from time to time.

In the correspondence columns will be found some letters which have been circulated by the Secretary to all Councillors.

It will be noted that it appears only one Railway gives a concession on Tea seed as regards freight, but the Tea Association have kindly taken the matter up, and we trust that their efforts will prove successful.

The Government of India, in their reply to the United Planters' Association's Resolution on the question of a remission of customs duty on ingredients used as insecticides and germicides, through Mr. Warburton, Secretary to the Chief Commissioner of Coorg, notify that they are unable to accept the Resolution.

The Joint Secretary to the Government of Madras, in reply to the Resolution forwarded on the subject of the Arsikere-Mangalore line, informs us, that His Excellency the Governor in Council is in favour of the early construction of this line. With such powerful support, it is hoped that the South Mysore Planters continually expressed desire, will at no great distance of time, become an accomplished fact.

We have much pleasure in publishing Mr. Mead's letter on the Labour Commission. To those who are earnest supporters of the proposal, Mr. Mead's last few lines will bring hopes that he may by it be persuaded to become a convert—we trust a willing one—for a man convinced against his will is of the same opinion still.

The Hon'ble Mr. Gosset's description of the visit to Costa Rica, and the methods employed there will be read with interest by all Coffee Planters.

We publish an interesting Lecture by Professor Dunstan, which should be carefully read by all Rubber Planters at this time when Rubber has fallen so low in price. He insists on the value of chemical research, thus emphasizing with his high authority, what has been so frequently insisted on in the pages of the *Chronicle*.

THE PRESERVATION OF CATTLE MANURE.

During the past eight years experiments have been conducted at the *Koilpatti Agricultural Station* with different methods of storing Cattle Manure. These experiments are now finished and it is concluded from the results that the action of Cattle Manure on cereal crops is largely mechanical.

The following results of the trials and the conclusions drawn from them are quoted from the *Annual Report* of the Station for 1912-13 as being of interest in connection with the work which is being done by the Scientific Department of the U. P. A. S. I. on Composts.

" *The relative advantages of different methods of preserving Cattle manure.*—Cattle manure preserved in different ways has been tested by applying it to plots of land in the black soil and comparing the yields one against the other as well as against no manure and other concentrated manures. The experiment has now been continued for eight years, except in one case where another method of preserving cattle manure has been tried only for the last three years. The land has been cropped with the normal four-course rotation of the district, *viz.*, first year, cholam ; second year, cotton ; third year, cumbu and fourth year, cotton

" The methods of preserving cattle manure which have been tested are as follows :—(1) *Box Manure.*—This is prepared by daily spreading the droppings of the cattle on the sunken floor of the cattle shed and allowing the cattle to tread on the manure. (2) *Byre Pit Manure.*—The cattle are tied in an ordinary shed with a masonry floor and the droppings are daily collected and put into a covered pit. The urine is also drained off the floor, collected and added to the solid dung in the pit. (3) *Heap manure.*—The cattle are kept in an ordinary shed and the solid excreta are thrown on to an exposed heap. (4) *The local method.*—This was introduced into the experiment only three years ago and is similar to the above except that the dung is thrown into a shallow pit and periodically covered with a layer of black soil. The figures of yields obtained from this last system are given in the statement of yields (Table V), but cannot be compared with the others as the plot had not been manured from 1903 until 1909 and the yields represent only the accumulative effects of three years application. Table IV of the appendix gives a statement showing the average for the last eight years of the actual weights of manurial ingredients applied per acre in lbs.

Table V of the appendix shows the average yields obtained from each crop and the annual average money value of the manure when compared with the no manure plot. The experiment has now been closed as far as the application of manures is concerned, but the yields from the plots are being registered for another rotation to find out the residual values of these manures. The figures in the statement show clearly that the action of cattle manure is to a considerable extent mechanical, thus the shallower rooted cereals respond much more to those forms of cattle manure which contain most organic matter. Thus the box manure contains (calculated dry) 56'9% of organic matter. Byre and Pit manure 45'01% and ordinary heap manure 38'87% and the table shows that the yields are greatest when most organic matter has been applied. The heap manure although it contains no urine shows a much higher rate of accumulation which averages 21'23 lbs. per day compared with Box manure 15'36 lbs., and Byre Pit manure 17'05 lbs. Thus it contains much more foreign inorganic matter besides which, being well weathered by exposure, it is in a much finer state of division and can therefore more readily become incorporated with the soil. That this has happened is shown by the yields of cotton obtained by the application of this manure. The heap manure has given an annual average yield of 805½ lbs. of kappas compared with only 752 lbs. from Box manure and 719¼ lbs. from Byre and Pit manure. That the cotton crop cannot make use of all the cattle manure which contains more organic matter is indicated by the yields obtained this year when fodder cholam was grown and when this crop has to depend solely on the residue of the manure applied the previous year to cotton. This year's yields of fodder cholam given in the table show that these residues are very large and in the case of cattle manure are highest where most organic matter has been applied.

The yields obtained by the application of more concentrated fertilisers when compared with those obtained from the use of cattle manure show that in the case of the superphosphates and saltpetre, it is possible to obtain good yields of both deep and shallow rooted crops, especially as regards the straw of the latter, but we find that the cost of the manure absorbs all the profit obtained by the increased yield; while the residual value of the manure as shown by this year's fodder cholam crop is very small when compared to those of cattle manure. It is possible, however, that these manures being soluble have worked their way deeper into the soil and next year's cotton crop will show whether this is the case. With regard to Neem cake, this has given very good yields from shallower rooted cereals and has given higher yields of cumbu than any other manures applied. The yields of cotton, however, have never been high and the residual value of the manure is much less than that of bulky organic manures. These heavy applications of manure have a considerable effect on the quality of the kappas and in all cases the ginning percentage is from 2 to 3% lower than in the case of the kappas from the no manure plot. The "local method" cattle manure is an exception, but this has only been applied for three seasons and not for eight seasons as in other plots. It is also a well rooted manure thoroughly incorporated with the black soil which has been added in the making and therefore is likely to work down deeper into the soil and thus render the cotton crop more drought resistant. In all the other cases, the manure is much more likely to remain near the surface and this would tend to form a development of a surface root system and this during the dry weather when the bolls are swelling would be likely to account for the low percentage of lint."

TABLE V.

Statement of the average crop Yields and their Values in the experiment to determine the Value of Cattle and other Manures. (Rotation :—1. Fodder Cholam, 2. Cotton, 3, Cumbu, 4. Cotton carried on for 2 full rotations.)

—	Fodder cholam dry fodder in lbs. per acre.	Cotton following fodder cholam. Kappas in lbs. per acre.	Cumbu in lbs. per acre.		Cotton following Cumbu. Kappas in lbs. per acre.	Average annual money value of the manure as shown by the crop yield.	Residual Value of the Crop.	
			Grain.	Straw.			As shown by crop yields 1912—1913 crop fodder Cholam in lbs. per acre.	According to money value.
						Rs. A. P.		Rs A. P.
Box manure	4,365	696	623	2,416	807	23 3 0	5.263	29 5 7
Byre and Pit manure	4,229	632	606	2,169	807	20 12 6	5,194	28 10 7
Heap manure	3,801	756	514	1,580	855	22 8 1	4.232	19 0 8
Neem Cake, 1,000 lbs.... ...	4,442	637	642	2,309	668	18 7 10	3.713	13 13 7
Superphosphate, 200 lbs. and Saltpetre 300 lbs.	6,168	742	517	2,190	787	27 2 11	3,162	8 5 5
No manure	3,323	425	280	595	460	......	2,328	......
Cattle manure—local method ...	...	713	462	1,122	589	......	3,920	15 14 9

Basis of money value:—Kappas ... 10 lbs. per Re. 1.
Fodder Cholam ... 100 „ „ „ 1.
Cumbu Grain ... 30 „ „ „ 1.
„ Straw ... 200 „ „ „ 1.
Represents cumulative and residual value of only three years.

CORRESPONDENCE.

No. 1040-8.

Indian Tea Association,
Calcutta, 9th October, 1913.

THE SECRETARY,
United Planters' Association of Southern India.

Railway Freights on Tea Seed.

Dear Sir,—I am directed to acknowledge the receipt of your letter of 11th September forwarding copy of a resolution adopted in the above connection at the annual meeting of your Association held in August. So far as the Committee know, the only concession given in the matter of the carriage of tea seed by railways is that granted by the Assam Bengal Railway; on that line tea seed may be carried by passenger train at goods rate. The Committee are addressing the various other Indian railways with a traffic in tea seed asking that a similar concession should be given by them. I will write you in due course informing you of the result of the representations which the Committee are making.

Yours faithfully,
D. K. CUNNISON.

Import Duties.

No. 2588

From

P. B. Warburton, Esq., I. C. S.
Secretary to the Chief Commissioner of Coorg,

To

The Secretary,
United Planters' Association of Southern India,
25, South Parade, Bangalore.

Dated, Bangalore, 16th October 1913.

Sir,—With reference to your letter, dated the 11th September 1913, addressed to the Secretary to the Government of India in the Legislative Department, recommending that a remission of customs duty should be granted on all ingredients used as insecticides and germicides imported by approved firms for *bonâ fide* agricultural purposes, I am directed to inform you that the Government of India have given their careful consideration to the proposal but regret that they are unable to accept it. The general tariff rate of 5 per cent is imposed solely for revenue purposes and the Government of India have definitely adopted the policy of refusing all applications for exemption from the general duties imposed by the Tariff Act save in very exceptional circumstances. In the opinion of the Government of India, the tariff is already sufficiently liberal in the matter of concessions for agricultural purposes, and no further extension of these concessions is necessary.

I have the honour to be,
Sir,
Your most obedient Servant,
P. B. WARBURTON,
Secretary to the Chief Commissioner,

Government of Madras,
Public Work Department,
No. 1035 Rly—7.

Arsikere-Mangalore Railway.

From

Mr. S. D. Pears,
Joint Secretary to the Government of Madras.

To

The Secretary to the United Planters' Association of Southern India,
25, South Parade, Bangalore,
Dated Ootacamund, the 16th October, 1913.

Sir,—With reference to your letter of the 9th September last addressed to the Chief Secretary to the Government of Madras, I am directed to inform you that His Excellency the Governor in Council is in favour of the early construction of the Arsikere-Mangalore Railway and that the matter has been, for some time, engaging his attention.

I have the honour to be,
Sir,
Your most obedient Servant,

For Joint Secretary. to Govt., P. W. D.

THE MOOPLY VALLEY RUBBER COMPANY, LIMITED.
Palapilly P. O,
S. India,
October 21, 1913.

Labour Commission.

The Editor,
The Planters' Chronicle,

Sir,—I waited for another issue of the *Chronicle* before replying to the numerous criticisms of my views on the Labour Question and the proposed Labour Commission.

First let me thank the various contributors to the discussion for letting me down so gently. Of Mr. Danvers it may truly be said, "Never a word didst thou mingle with gall." Mr. Danvers' letter seems to me to be rather an appeal for unanimity among South Indian Planters than an argument in favour of the utility and efficiency of the Labour Commission, and if it can carry the assurance that the establishment of a Commission would ensure us against the Labour Act and if it were certain that the support given to the Commission was practically unanimous, I would say, "Almost thou persuadeth me to be a convert."

Mr. Abbott asks me if I am pleased with the Labour situation. It seems to me that we must all judge this from the particular standpoint due to our actual environment. I personally class districts under three headings (1) The District such as this, which has not such a thing as a labour question and which I personally believe will never feel competition from any source. When one could easily double one's area in three years, clean weed every acre, provide tapping coolies and avoid bad debts, one is naturally loathe to ask one's directors to sanction a large annual expenditure. (2) The second class of district is I thing the most common. This is a District where the labour is generally pretty sound. In such a district the bulk of the labour is drawn from one or two sources. The coolies employed come up year after year to the district if not to the same estate. Some estates have heavy advances outstanding, others have small advances which are real assets, *i. e.*, annually recovered. The different state of the advance accounts on different estates is generally the difference of the management over a period of years. I confess that there is generally a shortage of labour at different times of the year but this is due to climatic conditions rather anything else. The rushes of leaf at certain times makes a huge labour force necessary if other works such as weeding are to be attended to at the same time. (3) The third class of district is one where for one reason or another the labour conditions are frankly unsatisfactory. Such a district has probably tried every conceivable source of supply and has advances out in all directions. If such a district employs Canarese South Canara coolies, Coimbatore and Erode Tamils, Malabar Malayalams (sic) Moplahs, Panniars Curambas, Badagas, it is quite obvious that to provide a commission to effectually control these sources of labour will be an expensive affair. The question is, should a district like the first I referred to be asked to contribute towards its cost? Further will the establishment of a commission really put matters right? Would not the money spent on the Commission produce more result if it were spent in encouraging one suitable class of labourer say the Canarese? In no district that I know of will you find all estates equally flush or short of labour. I have seen two adjoining estates, one full of labour with all advances sound, the other in a semi-abandoned state and with an advance account that was appalling. The moral is clear. It is management and continuity of management that is the biggest factor in the labour question, and if agents and proprietors would recognise this and not continually shift their men from one place to another there would be less bad debts and better labour on most places.

Mr. Duncan tells me that we will have to raise rates. I know nothing about the Anamalais, but I think in many cases rates are too low. When I am told that a district has cheap labour, I like to look at their cost of production and their advance accounts before I agree.

The Hon'ble Mr. E. F. Barber has convicted me of heresy. Though convicted by the voice of the multitude I am still a heretic. I can instance many estates which were more economically worked as private estates than they ever have been since they were put into a company. I still think that a district of the second order, or possibly two districts, adjoining each other and both drawing labour from the same centres could look after their labour cheaper than if they subscribed to a central commission and would keep in closer personal touch with the smaller commission and their labour.

I am opposed to a commission for this district because I consider it a waste of money, and I have grave doubts whether the establishment of a central commission will prove a panacea for the labour ills of a district in the third category, nor do I think that the money spent on the commission in such a case would be money spent to the greatest advantage. Such is my Credo.

If, however, the support accorded to the scheme proves to be nearly unanimous, the fact that the commission would protect us in great measure from the depredations of the recruiter for countries over seas, help us a little with the actual forwarding of coolies and give us undoubted assistance with regard to remitting money to the villages, I should consider that I was getting some return for my money. This and Mr. Danvers' advocacy for unanimity and the hope of the U. P. A. S. I. carrying more weight with the different Governments would probably persuade me to advocate coming into line. Whether it would equally convince directors and the shareholders I cannot say.

I am Sir,
yours etc.,
A. H. Mead.

October. 10th, 1913.

PLANTERS' ASSOCIATION OF MALAYA MEETING.

Freight on Rubber.

The Secretary said that as instructed he had written to the Rubber Growers' Association regarding the freight levied by the Straits Homeward Shipping Conference on rubber from the Malay Peninsula, and the general feeling seemed to be that with the present very considerable reduction in the intrinsic value of the commodity, the rates charged, when compared with those on other goods of equal bulk and value, were extremely unfair.

The R. G. A. had replied enclosing correspondence they had with the Shipping Conference on the subject, in which the latter refused to accede to their request for a reduction. The Shipping Conference pointed out that it was not intended in their letter of March 6 to indicate that the rate of freight was fixed on the particular value then existing, and that whilst due note was taken of the present reduced value it was considered that even such, in comparison with the values and rates of freight on other commodities, fully justified the present rates. It was further mentioned that the rates of freight from Para quoted in the previous letter were still in operation.—*Penang Gazette.*

Sub-soiling by Dynamite.

In response to a request for information as to how long the effects of sub-soiling by dynamite will last, Mr. R. B. Howard has furnished the result of his and of American experience in this regard. He says:—

'Some five years since I used the dynamite to drain a small depression or Swamp, which, previous to using the explosive, was always very wet—in fact, quite a morass. So far, the place has drained well, and, apparently, the fractures have not silted up. Again, I understand that in Victoria similar operations to those carried out by me were performed some ten years ago, and, so far, it has not been found necessary to renew the work. In America, from what I can gather from the various publications, it would appear that no attempt has been made to renew the operation, although, in some instances, the explosives had been used fifteen years previously. Personally, I hold the opinion that the constant percolation of the water will, in most kinds of soil, be sufficient to keep the soil open for very many years. Of course, in the case of fruit or other trees the roots would assist in maintaining the drainage caused by the explosive. The practice followed out by me when sub-soiling is to use the explosive once only, and, if properly carried out, I do not think it would be necessary to repeat the operation for at least ten years, and probably for a much longer period.—*The Queensland Agricultural Journal.*

COFFEE.

Coffee Plantations in Costa Rica.

The Hon'ble B. S. Gosset describes a visit he paid to some Coffee plantations in Costa Rica in the last issue of the *Bulletin of the Department of Agriculture*, Jamaica, to hand and the following extracts are taken from his interesting article.

" The Coffee fields on the older plantations are situated mostly on levels or easy slopes as the cherry coffee is carried from the fields in carts or on mule or horse backs to the works, or to tanks from which it is spouted to the pulping house and carried from the receiving tank in concrete gutters to the pulpers.

" Great care is taken with the nurseries which are kept like large vegetable gardens. The best seeds are sown in long beds and, when large enough, the seedlings are pricked out in regular rows and kept weeded till fit to plant out. New clearings are made from forest land, and the clearings are not burned but the limbs of the trees are lopped and packed in rows 12 feet wide and let to slowly rot by natural decay. The coffee is planted in rows 12 feet wide and the plants are put 6 feet apart in the row. No hoes are used for weeding but a machete is used to shave the weeds with about half an inch of soil away from the stems of the coffee and deposit them in the centre of the row. This machete is like a thinrick knife used for cutting hay and it is held in both hands and used most skilfully. The weeding jobs are calculated by the thousand and cost about 8*s*. per acre. Now and then when the weeds are rotted in the centre of the row they are thrown up round the stems of the trees to prevent exposure of the roots.

" Moderate shade is used at high elevations. Plantains are planted in the central rows and also a species of Guava which grows to a large size for shade. The latter trees are lopped when their shade is too dense and the loppings used as a mulch for the coffee.

" There is no pruning. The young trees are stumped about 18 inches from the ground and two or three suckers are allowed to grow which in crop bend down. The crop is picked by women and girls. The usual price for picking was six pence for a cuela; 20 cuelas go to a fenega which is expected to give 112 to 120 lbs. of cured coffee.

" Three Breast pulpers are used bedded in concrete. Two on a higher level pulp the cherry coffee which is led from the receiving tank by concrete gutters into the hoppers of the pulpers, and the pulped coffee is carried by water into a rotary iron washing screen or cylinder which separates the small beans and tails and these are carried into a third pulper and pulped over. The parchment coffee is in consequence even in size, as it is sized by the screen, and it can be more easily cured.

" The pulped coffee is carried by water into concrete fermenting tanks of which there are a large number. When fermented it is carried in broad shallow concrete gutters which wind backwards and forwards at an easy gradient for a considerable distance and washed in these gutters by men with wooden racks in a very simple and easy fashion. When sufficiently washed it is let out on the barbecues from a delivery tank and the water dried out of it by the sun. Some places use centrifugals to get the water out more quickly. It is then put into a rotary guardiola drier and kept going for about 48 hours when it is fit for shipment. Too hasty drying with too great heat spoils the quality.

" Most of the labour is done by white Peons of Spanish descent, a very reliable class. The current rate of pay is 2*s*. 6*d*. a day and they work in a steady way and need no driving."

RUBBER.

We reproduce from the India Rubber Journal an interesting lecture by Professor Wyndham R. Dunstan, F. R. S., Director of the Imperial Institute, on some chemical problems and the need of organisation in the Plantation Industry :—

" Professor Dunstan, having referred briefly to the rapid extension of the rubber industry in recent years due to the use of rubber tyres for motor vehicles—to the large amount of British capital embarked in the plantation companies, and to the large increase in production which had taken and was taking place, said the whole subject was an important one, and its success depended largely on scientific and technical investigation. Continuing he said: I cannot do better this evening than mention some of the principal facts and problems affecting the rubber industry, facts which must be realized by all those taking part in the advancement of the industry and problems which will only be solved by those who bring sound knowledge and scientific principles to the task. I assume most of those who will attend this course will look for employment as chemists in rubber factories in this country or on the plantations, where in future there will no doubt be openings for the employment of thoroughly qualified men. First, let me remind you that the most important rubber tree is Hevea brasiliensis, which in its wild state furnishes the greater part of the rubber output of South America, and in its cultivated state the output from the East, etc.

" Manufacturers assert that plantation Pará Rubber is in general, inferior to the best wild Pará rubber, being often deficient in strength and other useful qualities, and this inferiority is reflected in the lower price of plantation rubber as compared with the highest grade of fine hard Pará from South America. It is, however, admitted that some plantation rubber has proved to be equal to fine hard Pará. In dealing with this important problem of the quality of plantation rubber several factors have to be taken into account. The age of the tree undoubtedly affects the physical properties of the rubber, and most plantation trees are very much younger than the wild trees of the Amazon. The plantation tree is tapped more regularly and in general more often than the wild tree of the Amazon, and we have yet to ascertain precisely the effect of frequency and method of tapping on the quality of the rubber. The method of coagulating the latex and preparing the rubber of the wild tree differs from that followed in plantations. The Brazilian method is primitive and crude, and can no doubt be improved upon, and in perfecting the plantation method much may be learnt from a detailed examination of the Brazilian method, in which the latex is coagulated on a stick in the smoke of burning oil nuts, the coagulum of rubber being wound in layers on the stick until a large ball is obtained. One of the chief components of the smoke is acetic acid, which is usually employed as such to coagulate the plantation rubber, liquid acetic acid, being added to the latex, and the coagulated rubber being subsequently smoked in some cases. It is, therefore, apparent that in solving the problem of the cause of the alleged inferiority of much of the plantation rubber all these differences will have to be taken into account, and that scientific methods of investigation must be relied on in order to ascertain the facts. The truth is that the growth of trees in plantations and the continuous production of rubber from them is an entirely new undertaking, and presents special problems and difficulties which do not arise in connection with the wild trees of the forest. These problems and difficulties provide material for investigation by scientific specialists, by well trained chemists, botanists, mycologists and entomologists.

I now turn to other problems which again chiefly concern the chemist who has educated himself to be a rubber specialist. How is the composition and the quality of raw rubber to be judged? Raw rubber consists of the elastic constituent, caoutchouc, mixed more or less with certain impurities, principally composed of other constituents of the latex of the tree, which have become included in the rubber during coagulation and which have not been removed during the subsequent washing and preparation. These impurities are chiefly resins and proteids derived from the latex, together with water and small quantities of mineral constituents. At present no satisfactory method has been advised for estimating the quantity of the important constituent caoutchouc in the variable mixture known as raw rubber as it comes from the Tropics. The present practice is to determine the quantity of each of the impurities and to reckon the difference as caoutchouc. Thus, if it is ascertained that in 100 parts of rubber there are 1·6 per cent. of resin, 2·1 per cent. of proteids, and 0·3 per cent. of mineral constituents—that is 4 per cent. of impurities in all—it is assumed that the remaining 96 per cent. is caoutchouc. The errors in the determination of the impurities are therefore reckoned as caoutchouc. There is, moreover, evidence that what is regarded as caoutchouc in the calculation is not always a chemically homogeneous substance, and that attention will have to be paid to the precise nature of the chief constituent Having regard to the approximate character of rubber analysis as at present conducted, and especially to the probability that what is called caoutchouc may not always be one and identically the same substance, it is not surprising to find that two specimens of rubber which ordinary analysis shows to be of the same composition, may nevertheless differ in physical properties and not prove to be of the same quality for manufacturing purposes.

Some people have gone so far as to assert that chemical analysis is useless for the purpose of determining the quality of rubber. The truth is that an accurate method of chemical analysis has yet to be devised. This must not only include a direct method of determining caoutchouc, but one which takes account of possible differences in the composition of caoutchouc owing to the presence in it of other but probably very nearly related substances. Holding as I do the view that the coagulation of the rubber latex is wrongly classed with the coagulation of milk, and that the change from the liquid of the latex to solid rubber is more akin to the processes known to the chemist as polymerization and condensation, it would follow that light is likely to be thrown on this important question by a fuller examination of the chemistry of the latex as well as of the separated caoutchouc. By this means we may discover not only an accurate method of direct analysis, but also the cause of the variation in the strength of different rubber and the best method of preparing rubber with the greatest strength.

In view of the present defects in methods of chemical analysis, physical tests have been resorted to in order to determine differences not disclosed by analysis. The tests of tensile strength and elasticity are best made on rubber after vulcanization, and not before it, since vulcanized rubber is the form chiefly employed by the manufacturer. The determination of the viscosity of raw rubber solutions affords, however, a promising method of guaging the quality of raw rubber, since viscosity is a property which apparently may be correlated with strength and other valuable characteristics of the material. At present, however, the determination of viscosity of a rubber solution cannot be wholly depended on as a satisfactory indicator of the quality of rubber, although further research in this direction is well worth pursuing. Tests of the physical properties of the vulcanized rubber are all present probably the most useful in determining the quality of rubber, but in this region also much work remains to be done before entirely satisfactory methods can be perfected. The problem of determining directly the precise proportion of true caoutchouc present in raw rubber by chemical means will, however, in course of time be solved in this, as it has been in other cases. Fundamentally the physical properties of a given substance must depend on composition, and the exact determination of composition is the province of the chemist, I must not omit to mention that there are some who hold the view that the failure of chemical analysis alone to gauge the value of raw rubber depends on the fact that the so-called impurities, particularly the resins and proteids, contribute to make the value of the material. This, in my opinion, is unproved, but even if it were proved, the importance of the chemical research to which I have referred would not be lessened. As a fact, most rubber is at present bought and sold, not as the result of any scientific test, but by the primitive method of judging by the eye and pulling by the hand to judge of elasticity and strength.

While alluding to the nature of caoutchouc, I may say a few words about artificial or synthetic rubber. It must be accepted as a fact that caoutchouc identical with that obtained from the rubber tree can be produced by the chemist by purely laboratory processes and without the aid of the living plant. It only remains to perfect the process so as to obtain caoutchouc of the greatest strength and elasticity. As I pointed out seven years ago, this fact must be accepted, and the practical question is whether this synthetic rubber can be produced as cheaply as the rubber extracted from the tree. The answer to this question to-day is undoubtedly in the negative, and, with the prospect in the near future of large quantities of natural rubber being produced at a cost of less than one shilling a pound, the chances that synthetically produced rubber can compete against it commercially appear to me to be remoter than ever.

" Among other chemical problems awaiting solution of the precise differences in the composition of the latex induced by frequency of tapping a rubber tree at different seasons and periods of growth and in different ways. This is a problem that cannot be successfully attacked until more is known as to the chemical variation of " caoutchouc" and an accurate method of determining it has been devised. A curious and unfortunate property which rubber sometimes shows is that of " stickiness," when the rubber is said to be, " tacky." This property is sometimes observed in freshly prepared rubber, and at other times gradually makes its appearance in sound rubber. The origin and nature of " tackiness" have not been fully explained. Most of the problems which await scientific investigation, to which I have so far referred, relate to the production of rubber in the plantation or its preparation in the Tropics, and some of these can only be thoroughly investigated on the spot. There is, however, a rich field for investigation of a more technical kind in connection with the manufacture and uses of rubber. The process of vulcanization is at present not fully understood, and is no doubt susceptible of improvement. That rubber chemically combines to some extent with sulphur during vulcanization there can be no doubt, but in order to vulcanize successfully much more sulphur has to be added than the rubber can combine with, and the part played by the so-called uncombined sulphur is at present obscure. The uses of rubber are confined to a few industries, of which the most important is the manufacture of tyres.

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THE U. P. A. S. I.

(INCORPORATED.)

Contents.

Three District Association Meetings are published in this week's issue. We note that South Travancore do not see the necessity of a Labour Commission on the lines proposed by the U. P. A. S. I., and that the Coorg Planters' Association have carried their Resolution in favour of it by a narrow majority.

We would wish to correct an impression that is abroad, that the Extraordinary General Meeting for settling this question will be called in December. But we gather that it is not the intention of the Chairman of the U. P. A. S. I. or the Executive Committee to convene the meeting at so early a date, as time has to be given to Directors and absent Proprictors to express their views, and for the Executive Committe to collate them before presenting their scheme for final acceptance.

In the correspondence columns will be found an interesting letter from Mr. Nicolls, one of the Executive Committee, describing the intentions and scope of the proposed Labour Commission, which we trust will throw more light on the subject.

Mr. Abbott writes on the subject of the S. I. P. B. Fund to correct some impression that any Rules of this Fund were altered at the last meeting, and his letter is entirely in accordance with the shorthand notes taken at the time of the discussion.

" Novice " replies to a portion of " N. I. K.'s " letter in a late issue.

A " Beginner " in Tea asks some questions, which we hope will bring an answer from some practical Tea Planter.

Mr. Richardson has kindly furnished us with information about the Rates of Freight on Tea, Rubber. Coffee, etc., which are worthy of study. It is a question that the U. P. A. S. I. might take up, but we note that an application for a reduction on freight from the Malay Planters was lately refused by the Shipping Combine.

An article on the use of Flour Paste in spraying is published, which might be experimented with on a small scale, but it is not strongly advocated in the case of Green Bug, but it must have its uses, as it is favourably reported on from the United States.

DISTRICT PLANTERS' ASSOCIATIONS.

Wynaad Planters' Association.

Proceedings of a General Meeting held at Meppadi Club, on October 15th, 1913.

PRESENT.—Messrs. Bownass, Gillatt, Macbain, Macleod, Malcolm, Powell, Vernede, Whitton, Winterbotham, and C. E. Abbott, Honorary Secretary. *Visitors:* Messrs. Blackham, Mackay, Simpson. Mr. Macleod in the Chair.

1862. The Proceedings of last Meeting were confirmed.

1863. *Telegraph Office at Sultans Battery.*—Read correspondence. The question of the amount of guarantee required is still before Government.

1864. *Post Office at Vellera Mulla.*—Read correspondence about proposed site.

1865. *Non-Execution of Warrants in Mysore.*—Read letter to the Resident in Mysore. It was proposed by Mr. Malcolm seconded by Mr. Gillatt and carried:—"That the Honorary Secretary address H. H's Government, and ask to have Patels appointed to attest contracts in Mysore, pointing out the hardship that exists in the case of those working under Act I of 1903, that no Mysore official below the rank of Revenue Inspector is allowed to attest contracts, and that officials of the same rank as Patels are allowed to do so in British Territory."

1865. *Extradition from Cochin and Travancore.*—Read letter to Chief Secretary and reply stating that the matter would be considered.

1867. *Grant to Meppadi Club.*—As the Club is not proceeding with the issue of debentures, this subject was dropped.

1868. *School of Tropical Medicine.*—Decided to wait and see what steps the Government of India takes on the matter.

1869. *Photographing Coolies and Maistries.*—Read letter from Mr. Tavera, Magistrate, Vayitri, suggesting that such photographs should be taken as an aid to identification in case of legal proceedings.

1970. *U. P. A. S. I. Book of Proceedings.*—It was decided to order copies for all members at the cost of the Association.

1871. *Mr. Malcolm's proposal about Labour Rules for the District.*—This subject was discussed. *Resolved.:*—"That this meeting approves of the idea of District combination in the matter of Labour Rates, and the settlement of matters referring to defaulters; and that a Committee be formed to frame rules for the consideration of a special general Meeting"

The following Committee was appointed:—Messrs. Powell, Bownass, Gillatt, Macbain and Malcolm.

The Proceedings terminated with a vote of thanks to the Chair.

(Signed) D. H. MACLEOD,
Chairman.

(„) C. E. ABBOTT,
Honorary Secretary.

South Travancore Planters' Association.

Proceedings of the Fourth Quarterly Meeting of the above Association, held at the Club in Quilon on Sunday, October 5th, at 5 p. m.

PRESENT.—Mr. Chas. Brander (in the Chair), Messrs. T. P. Alexander, Chas. Hall, J. H. Parkinson, H. C. Seymour, Honorary Secretary. *By Proxy*: Messrs. L. G. Knight, S. Sinclair, R. Branson, J. Stewart, L. White and Val. Mardon. *Visitors*: Messrs. J. Mackie, E. Lord, and J. Henderson.

Before the Meeting commenced the Hon. Secretary apologised for being late, owing to several mishaps on the journey, the meeting having been called for October 4th.

Agenda Paper.—1. Pass Minutes of the last meeting.
2. Mr. J. H. Parkinson's Report on his visit to Bangalore.
3. Proposed Labour Commmission.
4. Correspondence and any other business properly brought before the meeting.

The Minutes of the last meeting were read and confirmed.

Mr. Parkinson then gave the meeting a brief sketch of the Annual Meeting of the U. P. A. S. I. held at Bangalore. The two items of most interest to this Association being the proposed Labour Commission and visit of the Scientific Officer. Mr. Parkinson then went on to say, that as regards the Labour Commission reports of which had appeared in the *Madras Mail* and *Planters' Chronicle* he had voted in favour of this not binding our Association in any way, but that the matter would be brought before the members at the next quarterly meeting. The Scientific Officer was, he said, unable to visit the District as previously hoped on October 25th, but would be in this District about the end of November.

As regards the Planters' Benevolent Fund it was pleasing to note that up to date only two cases had required assistance from this most deserving Fund. It was hoped that all Estates would support the Rubber Exhibition to be held in 1914. A vote of thanks was then passed to Mr. Parkinson thanking him for the very able way in which he had carried out his duties as delegate for this Association. The next item to be discussed was that of the Labour Commission. This matter was very fully and carefully discussed by those present, the general opinion being that this Association was not in need of a Labour Commission on the lines proposed by the U P. A. S. I. On the matter being put to the vote everyone was against it and it was proposed by Mr. Alexander seconded by Mr. Hall "That this Association does not see the necessity for a Labour Commission in the meantime."

Discussing the matter further it was suggested that a good deal of good would result if delegates from all Travancore Planting Associations could meet together say three times a year and discuss all matters relative to planting, etc.

Correspondence.—A letter was then read from the Central Travancore Planters' Association containing the following resolution: "That the Hon. Secretary do write to the Excise Commissioner requesting him to accept Coast Agents' Certificates as the guarantee against the importation of dutiable goods."

After a lengthy discussion on the matter it was proposed that the Central Travancore Planters' Association be written to for a fuller explanation of the Resolution.

There being no further business the Meeting terminated with a vote of thanks to the Chair.

(Signed) HUGH C. SEYMOUR,
Honorary Secretary.

Coorg Planters' Association.

Proceedings of a Meeting held in the North Coorg Club, Mercara, on Thursday, 16th October, 1913.

PRESENT.—Messrs. Mahon, Macrae, Mann, Maclean, Bracken, Gerrard, Wood, Cox, Hume, Dickenson, Nicolls, Graham, Newberry, Morgan, Martin, Grove, A. J. Wright. *Honorary Members*:—H. R. Ellis, Esq., I.C.S., (District Magistrate of Coorg), H. Tireman, Esq., (Deputy Conservator of Forests, Coorg), and L. G. Jonas, Esq. (Assistant to the Scientific Officer). *Visitors*: Messrs. Elsee, Brown, H. Ormerod, C. K. Thimmayya; and *by Proxy*: Messrs. H. G. Grant and G. C. Garrett. President—Mr. C. E. Murray-Aynsley and Mr. W. M. Ball, Honorary Secretary.

The President in the Chair.

1. The Honorary Secretary read the notice calling the Meeting.

2. Mr. Macrae read the report of the Delegates to the meeting of the U. P. A. S. I. and expressed the pleasure it would give Mr. Mahon and himself to answer questions on any subject connected therewith. After a short conversation in which a few questions were asked and answered, Mr. Bracken proposed and Mr. Murray-Aynsley seconded:—"A hearty vote of thanks for all the trouble they had taken in representing the Association in Bangalore." The Report read as follows:—

Mr. Chairman and Gentlemen,—You have doubtless read the newspaper reports of our doings at Bangalore, and whilst these were not altogether accurate, they enable you to follow, to a certain extent what we endeavoured to do on your behalf.

The Annual Book of Proceedings, which will be published shortly, will give you more concisely what actually took place, which we will now proceed to outline, as far as it concerns our Coorg Association.

The Arsikere-Mangalore Railway.—In seconding the Resolution brought forward by the Mysore Delegates, we took advantage of the occasion to say "That as far as *we* were concerned, regarding a railway to Coorg, we knew our cause was already in able and sympathetic hands, and at that we were prepared to leave it," which remark was evidently appreciated by the Hon'ble Sir Hugh Daly, who was present at the meeting.

Labour Commission.—Mr. Mahon was elected a Member of the Committee, who drew up a Report, a copy of which has already been sent to every member of the Association, and whilst this might have been fuller in detail, every endeavour was made towards forming a nucleus on which to base the general utility of the scheme, in the short time available. On this point we shall be glad to answer questions, to the best of our ability, as it is a somewhat difficult matter to explain in a few words.

Non-Service of Warrants.—Under non-service of warrants we brought up Mr. Martin's suggestion re the non-extradition from Travancore. It was pointed out that this was a very tender point with the Madras Government, which though actually having the right to enforce anything of this nature, were very reluctant to use that authority, and had refused to move further in the matter on several previous occasions. If Mr. Martin would however write to the Honorary Secretary of the local Association of that part of Travancore, in which his Maistry is said to be, giving all particulars, we venture to think he would receive satisfaction, as those delegates present expressed a wish to help wherever they possibly could, *Pest Act.*—The following resolution was carried unanimously, and which we trust has your approval:—

"That in view of the presence of Green Bug in the Coffee Estates of Southern India, it appears essential to this Meeting that Government should introduce some form of internal Pest Act, in order to strengthen the hands of the Scientific Staff who may be employed for stamping out the pest and keeping it under control. But would suggest that before any general Pest Act becomes law, its provisions should be submitted to the United Planters' Association for consideration and report."

The above resolution was arrived at and carried after much discussion, which was taken part in by Mr. Anstead, Scientific Officer to the Association, Mr. Bainbrigge Fletcher, Imperial Entomologist, Mr. Chadwick, Director of Agriculture to the Madras Government, and Dr. Coleman, Director of Agriculture to the Government of Mysore, who kindly gave us the benefit of their experience and advice, illustrating their speeches with numerous instances where such an Act would benefit us.

Fertilisers and Guarantees.—We seconded the following resolution brought up by the Anamalais, which we trust will have the attention of Coast Firms:—"That this Association approach the suppliers of fish manure pointing out that in view of the very large percentage of insoluble matter in some of the manure at present supplied by them, they should be asked to guarantee for the future that the insoluble matter shall not exceed five per cent. and that the members of the United Planters' Association be asked to give preference to those Firms who are prepared to give such guarantee, compatible, of course, with no appreciable increase in cost."

International Rubber Exhibition.—It was agreed that the Secretary should write and place the name of one of Messrs. Matheson and Co's employees on the Committee as attending on behalf of Coorg.

Adulteration.—This resolution brought up last year, was not pushed forward, at the time, as our Scientific Staff were too much occupied to undertake the necessary analyses, so the same was re-affirmed at this meeting. Mr. Frattini gave a very interesting demonstration one morning showing how the presence of foreign matter in coffee liquor was to be detected. In the instance of some tins said to hold pure coffee, it was computed the mixture contained no less than 60 per cent. of starch.

Retention of the Scientific Officer and a proposed Mycologist.—The following resolutions were passed on these subjects: "That the Nilgiri Resolution, dated 16th July, 1913, regarding the Scientific Officer be adopted."

A. "That this Association strongly holds that the appointment of the Scientific Officer still be continued and that Mr. R. D. Anstead should continue to act as Scientific Officer. Were another Scientific Officer appointed, it would mean that it would take such Officer at least two years to get into touch with the needs of the various Districts. It is understood that the gross value of the exports of planting products from the Madras Presidency amounts to 242 lakhs, and in consideration of these figures the Government contribution of Rs.5,500 towards the Scientific Department cannot be considered adequate.

B. "That this Association considers that the services of a Mycologist under the direct control of the U. P. A. S. I. is necessary, and that the Hon'ble Mr. Barber be asked to urge the matter on Government."

Import Duties.—The following Resolution was passed unanimously:—"That this Association do approach the Government of India with a view to obtaining a remission of duty on all ingredients used as insecticides and germicides, such remission of duty only to be granted to approved firms importing these goods for *bona-fide* agricultural purposes."

Mr. Mahon in proposing the above resolution said that the Association should pass a Resolution asking Government to exempt all machinery used for agricultural purposes and insecticides used for similar purposes from import duty. As regards insecticides he said that he got out a large quantity from Home to be used for planting purposes in Coorg. They had given fairly successful results, and were likely to give better in the future, if given an extended and more thorough trial. He thought it a pity that these experiments should be hampered by a heavy import duty. This was seconded by Mr. Hunt, of Mysore, who spoke to the same effect.

New Markets.—It was resolved that the Secretary write and ask the Australian Board of Agriculture for general information *re* the possibility of securing a Market for the sale of coffee in that country.

Export Duty on Bones.—The following is the text of the Committee's Report adopted: "Your Committee after considering the question of the Export of Bones and Indigenous Fertilisers, is of opinion that this Association should request the Board of Agriculture in India not to lose sight of the importance of cheap manures to all classes of agriculturists, and suggests for its consideration the imposition of an export tax on indigenous fertilisers, as we are of opinion that such a tax, even if it fail to reduce the local price, will provide funds which could be devoted to the encouragement of both the manufacture of superphosphate and the oil crushing industry. We should like to see a resolution passed at this meeting which will give effect to our suggestions."

Mr. Mahon proposed and Mr. Hunt seconded that the Report be adopted.

Planters Benevolent Fund.—You will have had the Secretary's report on this, but we also brought it to the notice of the Meeting that the Fund was not being supported by some Associations in the manner anticipated in the original idea. The Kanan Devans explained that they already had one of their own, so that they did not support the United Planters' Association Fund as liberally as they otherwise would do. Although nothing much more was said, still we think good will accrue from our having brought the matter up.

Hybridization of Coffee.—Mr. Anstead informed us that the Experimental Plot on the Nilgiris was coming on quite satisfactorily and that nothing more could be said about it at present.

In conclusion we would impress on our Members generally that they would gain a lot by attending these meetings in Bangalore more than they do at present. Not only would they meet brother planters from other Districts, but it would also be an opportunity to discuss and exchange opinions on all matters affecting the Planting industry of Southern India.

3. *Labour Commission.*—The Honorary Secretary called the attention of the meeting to the report of the U. P. A. S. I. Labour Committee and to the proposed Labour Commission and pointed out it would be necessary to decide whether or not the Association would support the scheme for a Labour Commission. There ensued a long and somewhat desultory discussion during which Mr. C. E. Murray-Aynsley pointed out in forcible language how the old Coffee Estates which had their Labour well-establish-

ed would be paying to obtain labour for the new openings of the big produce companies of S. India; Mr. G. K. Martin gave from his own experience a concrete case in which a Labour Commissioner would have been of great assistance to him and Mr. H. M. Mann spoke in favour of the scheme as tending to prevent inter-district competition, and the Honorary Secretary referred Members to the speech of Mr. Scoble Nicholson, of the Ceylon Labour Commission, at the Bangalore Conference as showing how the two Commissions might combine for the common good.

A member having asked the Delegates to Bangalore if it was intended that the Commission should recruit coolies, the answer was in the negative. Some members thought that the scheme was at present too vague for them to give a definite decision. The majority of the members were of the opinion that Coffee was being asked to pay more than its fair share considering the fewer coolies per acre required in comparison with Tea, or Rubber. Finally the Chairman having called the meeting to order, Mr. Macrae in an able speech moved :—

"That this Association recognises that something more than we have at present is wanted for the protection of labour in Southern India; that it thinks this proposed Labour Commission if properly worked will go a long way towards this, and that it is, therefore, prepared to support it, and, with this in view members will send in a memo. of their subscribing acreages on as early a date as possible, and that Members who are not in a position to state definitely if they can support the scheme should consult their proprietors." This was seconded by Mr. Mahon and there being no amendment proposed the Chairman put it to the vote, when it was carried by a narrow majority.

In continuation of the above Mr. Macrae said it must be understood that the foregoing proposition be for a period of 5 years at a total of Rs.6 per acre, Rs.2 the first and Re.1 for succeeding years.

4. *Mail Service* —Mr. Mahon in introducing Mr. H. Ormerod to the meeting pointed out the inefficiency of the present tonga service and Mr. Ormerod explained the terms on which he would be able to run a Motor Service. Mr. Mahon proposed and Mr. Murray-Aynsley seconded "That this Association do support Mr. H. Ormerod in his endeavours to obtain the contract for the carriage of the Mails by Motor Service"................. Carried *Nem. con.*

It was also arranged that the President and Honorary Secretary should meet Mr. Harrison, the Postmaster-General, Madras, during his visit to Mercara on Sunday, 19th.

5. The following new members were proposed, seconded and duly elected:—W. Egerton, Esq., A. E. J. Nicolls, Esq., C. H. Browne, Esq.

6. *Correspondence on the Table.*—Letter from the Offg. Secretary to the Government of India, Department of Commerce and Industry, forwarded by the Chief Commissioner of Coorg, as to the desirability of Legislation in connection with the use of the term "Bank" in this country.

Letter from the Commissioner of Coorg *re.* the Coorg Noxious Weeds Regulation. Letter from the Postmaster-General, Madras Circle, forwarded by the Commissioner of Coorg *re* the Mail Tonga Service.

7. The meeting closed with the usual vote of thanks to the Chair.

(Signed) W. M. BALL,
Honorary Secretary,

CORRESPONDENCE.

Meppadi, 24th October, 1913.

S. I. P. B. Fund.

THE EDITOR,
The Planters' Chronicle,
Bangalore.

Sir,—One very definite delusion and a little resentment seem to have arisen about the handling of this matter at the recent U. P. A. S. I. Meeting. Will you allow me space to deal with them?

The Anamalai Delegates in their Report published in the *Chronicle* of 18th instant state (evidently with disapproval) that it was decided that Eurasian gentlemen may be allowed at the discretion of the Committee to subscribe to the Fund. I know that there are others who believe that this change was made.

Rightly or wrongly, Rule IX a & b of the S. I. P. B. Fund is quite definite on this matter and it was not altered. None but Europeans can join the Fund. This rule cannot be altered without a special resolution, and the memo. published in the *Chronicle* of September 6th shows, that no such resolution was passed. You have been good enough to get me a proof of the discussion which will appear in the Book of Proceedings and it is quite clear that no such resolution was even proposed. Mr. Nicolls mentioned that he considered it a hardship that a certain member of his Association should be excluded. But he went no further.

Then Mr. Lovett said that a Eurasian Proprietor, a Member of his Association had subscribed for two years. Mr. Lake pointed out that the subscriptions had been accepted under the old rule which admitted "Proprietors of Estates" without distinction of nationality. You confirmed this. Asked for my opinion as Chairman, if subscriptions taken under the old rule ought to be returned, I said I thought not, but that the present rule must be strictly adhered to in future. That was the end of the discussion on the S. I. P. B. Fund and shows that no alteration of the existing rule was made, and that neither the Finance Committee nor anyone else has power to accept subscribers who do not fulfil the conditions laid down in Rule IX.

The other matter that has attracted some adverse criticism is the decision to publish the names of beneficiaries for the information of subscribers in the Annual Report. I am strongly in favour of this being done, and was backed up by Mr. Richardson, Mr. Barber and Mr. Duncan. The feeling of the Meeting was with us. To compare small things with great, at a time when Cabinet Ministers are openly accused of playing fast and loose with the Party Funds, and the Chief Whip is received with insulting remarks about his "Co-Trustee," humble individuals like the Finance Committee cannot afford to run any risks. If in ten years' time anybody begins to ask questions let there be a clear precis in the Annual Reports of the reasons for each grant and the name of the recipient to answer him.

Your obedient servant,

C. E. ABBOTT.

Daverashola Estate,
Daverashola P. O., Nilgiris,
October 21st, 1913.

Labour Commission.

In regard to the North Mysore Planters' Association request for "Further Information as Regards Working Details of the Proposed Labour Commission."

Sir,—At the last U. P. A. S. I. Meeting the main point discussed was the advisability of starting a Labour Commission. A Committee was appointed to go into the matter (Page 2 of the Labour Committee Report para. 2). The meeting then appointed a Committee to go fully into the question of the establishment of a Labour Commission, and to forward working details and report on the whole question.

I admit that working details might possibly have been enlarged upon by the Committee, but the time they had, within which to draw up their report, and to make a rough estimate of expenditure, so as to arrive at what might be the total amount required to run the Commission on, was limited. Their report I think conclusively proved the main point, *i.e.*, the advisability of starting a Labour Commission, and the benefits to be obtained from it.

Working detail—is a matter which must finally be settled when the Extraordinary General Meeting meets at Bangalore. Experience and the Chief Commissioner can only eventually settle them satisfactorily. We fortunately have the experience of the Ceylon Labour Commission as a guide. We are not starting our Commission as they had to do, with no star to guide them. I have taken my line from theirs, and I hope what I have written will satisfy the North Mysore Planters' Association for the time being. The Ceylon Commissioner has only to turn the stream to one outlet when his responsibility ceases; the Commissioner of the South India Labour Commission will have several.

WORK OF DEPARTMENTS.

The Commissioner.—To supervise the work of the European and Native Assistant both at head-quarters and by frequent touring. To act as banker and be responsible that money remitted to the agency by planters is used for the purpose it is intended. To forward accounts and reports to the U. P. A. S. I. To enquire into possible new recruiting ground. The general carrying out and the working of the scheme, and will be directly responsible to the U. P. A. S. I.

Office Assistant.—To be responsible for keeping accounts and books up to date. (A complete register of kanganies and maistries will be kept.)

To undertake the duties of the Commissioner when on tour. It will be absolutely necessary that he should be a first class accountant.

Assistant Commissioner.—The moral effect of a European in villages from time to time cannot be denied.

A part of every month to be spent in travelling through the recruiting districts. When on tour distributing advertisements. Obtaining useful information as regards available labour supply. Looking up kanganies or maistries who have been sent for recruiting purposes. Interviewing officials. Forwarding reports on kanganies or maistries to estates interested, and helping them in every way if they are in any difficulties. Forwarding monthly reports to the Central Office on recruiting prospects in their districts.

Native Assistants to the Assistant Commissioner.—It will be understood that it will be impossible for the Assistant Commissioners to carry out every detail of their work without assistance. It is suggested that a certain number of travelling Native Assistants should be appointed. They would be continually on tour. They would see that the point of advertising was thoroughly carried out. If the right men are procured they ought to prove a mine of useful information to Assistant Commissioners. Their continual moving from village to village would I think bring it home to the kangany or maistry that they were under observation and that they would have to account for any adverse reports. It would also be their duty to help subscribers' maistries.

SCOPE.

The South India Planters' Labour Commission has been established in order to facilitate in every way the recruiting of agricultural labourers for South Indian estates.

The Commission undertakes no direct recruiting, but the scope of the Commission consists in the following:—

1. Registering coolies at the various agencies and forwarding them on to Estates.

2. Passing them through the depôts, feeding and protecting them from molestation in every form as far as possible.

3. Rejection of medically unfit and undesirables.

4. Supervision of maistries or kanganies sent to recruit, and furnishing reports to the estates from which they come.

5. Helping maistries or kanganies in drawing up contracts and if necessary getting same readily attested.

6. Furnishing information to the Coast Agency Committee and the estates concerned as to labour conditions ruling in districts and prospects of recruiting in the various districts from month to month based on camping reports furnished by the controlling staff.

7. Advertising South India throughout the recruiting districts of South India, overlooking criticism of all recruiting carried out in South India with the object of maintaining its good name.

DEFAULTING DEPARTMENT.

1. Helping maistries or kanganies in tracing defaulting coolies with a view to inducing them to return to the estates or in the recovery of advances.

2. Helping planters in tracing defaulting maistries or kanganies and inducing them to fulfil their contracts or in the recovery of advances.

Yours faithfully,

J. S. NICOLLS.

22nd October, 1913.

The Labour Problem.

THE EDITOR,
The Planters' Chronicle,
Bangalore.

Dear Sir,—There are a couple of fallacies in N. I. K's letter in your issue No. 42 which I venture to correct.

The first is N. I. K's fear of the consequences of authenticated criticism and he cities Kipling's B. B. as an instance. He forgets however that B. B. was a Government Official and we all know that the motto of the "little Tin Gods on the mountain side" is "You work—I think" but with us planters I hope the position is different.

We are, or ought to be, business men, and any healthy, intelligent if disagreeable criticism which tends to assist us in the pursuit of the elusive rupee should be welcomed by all.

If there are any visiting agents or managers existent amongst us whose motto is that of the Simla bureaucrats, and N. I. K. is unfortunate enough to be serving under one of them, he has my sympathy but the remedy is in his own hands. Let him look elsewhere for his bread and butter (if he is not too fond of the butter) N. I. K. further on in his letter states "non-increasing population..............whatever else happens."

Tut, tut, N. I. K. do you really believe that any considerable body of Government servants in the higher grades of the Indian Services adopt that principle in their life work and that the Government are actuated by such a motive in encouraging emigration? I cannot believe you are serious (India with a population of 350 millions or thereabouts and people talking about shortage of labour and advocating restriction of emigration. Ye Gods)

Yours faithfully,
"NOVICE"

P. S.—I have adopted a nom-de-plume but for very different reasons to N. I. K.

"N."

Tea Queries.

The EDITOR,
The Planters' Chronicle.

Dear Sir,—Would some one interested in Tea kindly inform me whether young tea plants should be put out in the field before the seed has dropped off the stems even if planted with ball or in baskets? I have been told that this has proved to be absolutely wrong, and has been the cause of failure in planted up areas. Should no plant be put out before the seed has dropped or be absorbed into the plant? Does the fact of tea shrubs flowering at some 14 months after planting out, prove that this must have been a poor jat of tea seed and should the flower be nipped off?

Yours faithfully,
BEGINNER.

Bangalore, 28th October, 1913.

Tea Freight, etc.

FREIGHT ON RUBBER, TEA, COFFEE, COPRA AND POONAC.

THE SECRETARY,
U. P. A. S. I.,
Bangalore.

Dear Sir,—I give below statement of freights charged on the above products from Colombo and Malabar Coast to London. As you will see the charge on rubber is out of all proportion with the charges on other products, and I think considering the present state of the Rubber market which necessitates the cutting down of expenditure in every possible way it is only fair that the shipping Companies should meet us and reduce their charges on freight I am advised that the best mode of procedure will be for the U.P.A.S.I. and the Ceylon Planters' Association to approach the Steamship Lines through their Agents at Colombo, Tuticorin, Cochin and Calicut. For the information of District Associations it will be advisable to publish these figures in the *Planters' Chronicle.*

In the meantime I am writing to all District Associations interested on the matter.

Yours faithfully,
J. A. RICHARDSON.

FREIGHT ON RUBBER, TEA, COFFEE, COPRA AND POONAC.

Freight on	*From Colombo.*	*From Malabar Coast.*	
Rubber in cases per Ton of 50 c. ft.	... 65/-	Per Ton of 50 c. ft.	65/-
Tea do do	... 33/-	do	30/-
Coffee in bags per Ton of 16 cwts.	... 32/6-	Per Ton of 18 cwts.	30/-
Copra „ per Ton of 12 cwts.	... 30/-	Per Ton of 12 cwts.	28/9
Poonac „ per Ton of 17 cwts	... 27/6	Per Ton of 17 cwts.	28/9

The rates given in each case being the rate to London.

TEA-DRINKING IN FRANCE.

Although in Paris tea drinking has become popular to a certain extent in fashionable circles, and the imports of tea into France are increasing, there is plenty of room for further work in exploiting the leaf in various parts of the country. In some departments Ceylon tea has acquired a fairly firm hold, thanks to the efforts of some British traders; but the average French consumer has not yet troubled to discriminate between British grown tea and the Chinese product, although more familiar with the latter. Annam tea, which is not a fascinating beverage to palates accustomed to other teas, finds a fairly ready market in France, but there is a fine opportunity for further enterprise in instructing the French people as to the merits of Indian and Ceylon teas.—*The Ceylon Observer.*

INSECT NOTES.

The Use of Flour Paste in Spraying.

Results of interesting experiments in the use of flour paste in connection with spraying are described by W. B. Parker in Circular No. 160 recently issued by the Bureau of Entomology of the United States Department of Agriculture.

In the belief that the information will be likely to be of interest to many of the readers of the *Agricultural News* this circular is abstracted in the present article.

FLOUR AS A 'SPREADER.'

In the course of trials to find a suitable 'spreader' for the lime-sulphur solutions used as a spray against the red spider (*Tetranychus bimaculatus*) on the hops in California, it was discovered that flour paste not only answered that purpose but also seemed to serve, to a certain extent, as an active insecticide.

As a spreader it was found that when flour paste has been added to the lime-sulphur solution, it has the effect of causing the spray to adhere to the leaves as a thin film; whilst without the addition of the flour paste, the lime-sulphur sprayed on the plants in the same way, collected in drops or globules.

For this purpose the flour paste is used at the rate of 4 gallons to 100 gallons of the lime-sulphur solution, each gallon of paste containing 1 lb. of flour.

The beneficial effect of the spreading wss very considerable for whereas the lime-sulphur spray used without the 'spreader' gave a result of only 37·5 per cent. of the mites (red spider) killed in a certain instance, it was found that with the addition of flour paste the same strength of lime-sulphur gave results as high as 99 per cent. killed.

VALUE AS AN INSECTICIDE.

A series of trials was made with nicotine-sulphate against the hop aphis (*Phorodon humuli*) in which flour paste at the rate of 4 gallons to 100 gallons of the nicotine-sulphate solution at strengths of 1 in 2,000 and 1 in 3,000. In these trials from 99-100 per cent. of the aphides were destroyed.

During the trials it was observed that many of the smaller aphides were pasted on to the leaves. Accordingly, flour paste used without any other insecticide was tried, and it was found that when used at the rate of 8 gallons (—8 lbs. flour) in 100 gallons of water or even stronger (say (10-100 or even 12-100) most of the young and tender aphides (97 per cent.) and of the red spiders were killed, and at the same time, no damage was done to the hop plants even when in full bloom.

The older and stronger aphides, and the eggs of the red spider, were not killed by the flour paste. In this later case, it was found necessary to make a second application, seven to ten days later, in order to reach the mites that emerge from the eggs.

COST.

In a series of five experiments against red spiders on hops with flour paste at the rate of 8-100, it was found that from 99·8 to 100 per cent were killed. The solution costs only 17·6c. per 100 gallons.

Flour paste has been used successfully against red spiders upon the following plants: beans, chrysanthemums, hops, cucumber in greenhouse and field), pumpkin, pear, prune, roses in field), violets (in greenhouse and field). In the case of chrysanthemums, the leaves may become spotted if spraying is done too near the time of blossoming. Flour paste was not found satisfactory when used upon greenhouse roses, greenhouse carnations or field sweet peas.

PREPARATION OF PASTE.

To prepare the Flour paste, mix a cheap grade of wheat flour with cold water, making a thin batter, without lumps; or wash the flour through a wire screen with a stream of cold water. Dilute until there is 1 lb. of flour in each gallen of mixture. Cook until a paste is formed, stirring constantly to prevent caking or burning. Add sufficient water to make up for evaporation.

'Flour paste may also be prepared by stirring boiling water into a moderately thin batter until there is 1 lb. of flour in each gallon of mixture, and allowing it to stand until the starch is all broken down.

'If the paste is not sufficiently cooked, the resulting spray will not be effective, and if overcooked the paste will harden when thoroughly cool, and will not mix water very readily. Usually, however, the paste is used as it is prepared, and overcooking is not a disadvantage.

'When mixed in the spray tank, flour paste has a tendency to settle, and in order to do satisfactory work, agitation is necessary. This is but a slight disadvantage, and is necessary with most materials.

'Flour paste appears to be a very effective spreader for lime-sulphur and nicotine sulphate sprays. Cheap flour can be purchased for less than half the cost of whale-oil soap. It is always obtainable, and having no odour, it is less offensive to use than the whale oil and fish oil soaps. When used alone at the rate of 8 gallons (8 lbs. flour) to 100 gallons of water it is effective againtst several leaf-feeding mites and some very delicate aphides. The possibility of its use as a spreader for lime-sulphur sprays for scale insects and fungi and as a 'sticker' for arsenicals has not yet been worked out, but from observations during the past four months it is believed that it may have some value along these lines.'

EMPLOYMENT IN CONNECTION WITH CITRUS FRUIT.

The *Monthly Bulletin.*—of the California State Commission of Horticulture, for June 1913, contains a brief account of similar trials by J. P, Neuls of the United States Department of Agriculture in the use of the lime-sulphur solution with flour paste with check trials in which the lime-sulphur was used without the flour paste added, against the citrus red spider *Tetranychus mytilaspidis*. Check trials were made with the spray without any flour.

The objection to the lime-sulphur solution was that it spotted the fruit, that is to say, the spray mixture collected in drops on the fruit, and when the water evaporated the solids remained in conspicuous spots, which in the case of the fruit, had to be washed off before it was packed.

The results of these trials showed that the addition of the flour paste greatly increased the efficiency of the spraying and that there was no spotting of the fruit necessitating washing,

WEST INDIAN EXPERIENCE.

As further evidence of the useful nature of flour paste in spraying it may be added that a correspondent of the Imperial Department of Agriculture in Barbados has tried flour paste (8-100) against red-spider on roses in the garden and reports good results from one application.

(*The Agricultural News*, September 13, 1913.)

The Planters' Chronicle.

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THE U. P. A. S. I.

(INCORPORATED.)

Contents.

We publish the Proceedings of the Central Travancore Planters' Association, the most salient feature of which, from a general point of view, is the Resolution passed supporting the proposed Labour Commission; and Mr. Dandison writes a letter of interest on the same question, which throws some further light on the subject, as regards local labour, and how tempted by large advances, local Badegas have become migratory. The short foot-note at the end of his letter, extracted from "Capital" has frequently been the text of speakers at the Annual Meetings of the Association. The invidious distinction hitherto shown by the Madras Government in favour of overseas recruiters, must be broken down; but can only be so broken down by the Southern Indian Planters' themselves.

The *Planters' Chronicle* has been a consistent advocate of the use of Explosives in Agriculture, especially in opening up new land, so we make no excuse for extracting and reproducing a very interesting article on the subject by Mr. F. R. Treleavan in the *Queensland Agricultural Journal*, which, coming from one who has studied the subject and experimented for eleven years, carries conviction that its use is most advantageous, and its results most fruitful.

That Standardization of Rubber is occupying the minds of leading men is known to all, and we reproduce Doctor Lyne's Scheme of how to meet the requirements of the present day. Lord Grey's remarks on the value of co-operation are worthy of careful perusal. Uniformity must be the watchword of all Rubber Planters.

To be successful now-a days in agriculture, the help and the advice of the Agricultural Chemist is absolutely necessary. Agriculture is a progressive science, and to combat pests and diseases, and to secure the utmost fertility of the soil, the aid of the scientist is daily called in, to assist and develop it with the happiest results, and the more the contact between the planter and the scientist can be encouraged, the more will that contact be appreciated by the practical planter. An article we reproduce on the subject will be read with interest.

DISTRICT PLANTERS' ASSOCIATIONS.

Central Travancore Planters' Association.

Minutes of the third Quarterly Meeting of this Association held at Carady Goody Bungalow, on Saturday; 25th October, 1913, at 10 a m.

PRESENT.—Messrs. F. Bissett (Chairman), W. H. G. Leahy, H. C. Westaway, J. H. Ellis, J. S. Wilkie, F. W. Winterbotham, R. D. Scoble Hodgins, T. C. Forbes (*by his Proxy*), J. S. Wilkie, and R. P. Roissier (Honorary Secretary).

The Notice calling the meeting was read.

The proceedings of the last Meeting were confirmed.

The Chairman, before starting on the business of the day, said that he wished to extend a hearty welcome to Mr. Leahy and said how pleased we are to have him amongst us again. (Applause) Mr. Leahy thanked the Chairman and the Members for their kind welcome.

Correspondence.—Read U. P. A. S. I. Circulars Nos. 18/13, 17/13, 13/13, 14/13, 16/13, 15/13. Read letter from the President, Fourth International Rubber Exhibition. It was resolved that Mr. Bissett represent this Association at the Conference. Mr. Bissett accepted and thanked the Members for electing him as their Delegate. Read letter from the Excise Commissioner No. 15462 of 26th July. Read letters from the Honorary Secretary, Kanan Devan Planters' Association of 31st July and 12th August. Read letter from the Excise Commissioner No. 312 of 25th August. Resolved that the Honorary Secretary do write again to the Excise Commissioner on the Subject of Import Duties. Read letter from the Honorary Secretary Mundakayam Planters' Association of 30th August. Read letter from Honorary Secretary, West Coast Planters' Association of 18th August and of 7th October. Read letter from Messrs. Aspinwall & Co., Ltd., of 11th August. Read letter from Messrs. Harrisons & Crosfield Ltd. of 11th August. Read letter from the Resident of Travancore and Cochin of 21st September. Read circular letter from U. P. A. S. I. of 21st August, Read letters on the subject of the proposed Labour Commission from Acting Manager in India, Travancore Tea Estates Co., Ltd., Superintendent, Arnakal Estate, Superintendent, Cheenthalaar Estate, Superintendent, Pullikanam Estate, Superintendent, Carady Goody Estate, Superintendent, Glenmary Estate, Superintendent. Stagbrook and Mai Mallay Estates, Superintendent, Ashley Estate, General Manager, Wallardie Tea Company. Read letter from Superintendent, Devicolam Division of 23rd September. Read letter from R. D. Anstead, Esq., Planting Expert, *re* proposed Tour in Peermade. The programme for Mr. Anstead's Tour was then arranged.

Report of the Bangalore Delegates.—Mr. Chairman and Gentlemen, —Mr. Wilkie and I attended the U. P. A. S. I. Annual Meeting as your Delegates. The Meeting was held at the Mayo Hall, Bangalore, starting on Monday 25th and ending on Friday 29th August. You have all by now read, in the *Chronicle*, the Secretary's Report and the Chairman's address. I would like to draw your attention to this most interesting address and especially to the remarks dealing with the Planters' Benevolent Fund and the Labour Question. As regards this point I shall have more to say later on. I should also like to draw your attention to the Scientific Officer's Report. I hope that you will all purchase the Annual Book of Proceedings.

Weights and Measures.—The Delegate for the Kanan Devan Planters' Association proposed a resolution which was carried unanimously. The Resolution was:—"That this Association confirms its resolution of last year and again approaches the Government of India in hopes that the Standardisation of weights may speedily become law." You will remember that this was brought up in 1910 and 1911 and we hope now that this will be the last time that it will be necessary to bring this before Government.

Roads and Communications.—The Kanan Devan Planters' Association delegate brought before the meeting our old friend the Theni Bridge, He properly pointed out that the planters as a body are largely instrumental in opening out large tracts of country which would otherwise remain Jungle and thus creating sources of revenue and that in the case of this Bridge they had been most unsympathetically dealt with. He pointed out also that the road on the Kodaikanal side and other routes most frequented by Missionaries and Government servants were maintained in good state, whilst the roads on the Peermade side were never or only inadequately repaired. Mr. Hughes proposed a resolution drawing the attention of the Government of Madras to the continued delay and waste of money on the construction of the Theni Bridge and to the bad state of the roads and that the Madura District Board be given orders to speedily complete the bridge and maintain the roads in really good order. This resolution I seconded and it was carried unanimously.

European Defence Association.—This you have all read about and also those of you who have joined this Association will have received the copy of the proposed new rules and also the proposed change of name. I can only ask those who have not as yet joined to do so without further delay as it is an Association to which all Europeans in India should be members.

London School of Tropical Medicine.—There is an endowment fund for the purpose of the School of Tropical Medicine and a resolution was put forward proposing that the U. P. A. S. I. give £20 to the fund and also ask other Associations to support financially towads the £10,000 required. This resolution was carried. Eleven voted and the remainder did not vote.

Labour.—There were two schemes to be brought up at the meeting for the Registration of coolies but these were withdrawn as these would not be necessary with a Labour Commission. You have all received the Report of the Labour Committee. There were three proposals for the Committee to discuss and these were put before the Delegates at the Meeting. They are:—Abolition of the Professional Recruiter, Establishment of a Labour Commission, Consideration of the question of advances or premiums paid to secure the coolie's services.

Taking the first proposal the meeting was quite agreed on this point and the Professional Recruiter was defined as "an individual who receives so much per head for coolies delivered after which he ceases to have any further interest in them or their future interest or whereabouts as distinguished from the authorised Kangany or maistry."

As regards the Labour Commission, a Committee was formed to go fully into the matter of establishing a Labour Commission and to draw up an estimate and report. From the report which you all have, you will understand exactly what is required and what is proposed to be carried out. It was unanimously agreed that we should have a Labour Commission and Delegates were to bring this matter before their Associations to obtain their views and to ascertain the acreage that would be joining the Scheme so that at an extraordinary general meeting of the U. P. A. S. I. to be held about the end of November the scheme could be sanctioned and arrangements made to start the Commission right away. I think that we members of this Association firmly believe that we must have a Labour Commission. Of the advantages to be obtained I have only to refer you to the Report but without that report I think that we all realise the advantages of a Commission. To many Rs.2 per acre may seem high. At the same time those of us who have Labour Agents will not I think consider that this estimate is out of the way. This amount would not be called up all at once but only as it is required. Again after this Rs.2 would only be to start the scheme and even if it did remain somewhere near about Rs.2 I think that the benefits which would be derived from this Labour Commission would amply repay us. You cannot start any scheme without at first having to put your hands in your pockets and if we planters of South India are to have a Labour Commission then I say we must have one started on a sound basis and also a Commission so run that our neighbours across the water will realise that our Commission is as good as theirs and one to be respected and this we are not going to do, if from the very start we are going to think of cutting down expenses. As I said the estimate is for Rs.2 per acre and I think that we should agree to that. I hope that those Estates in this Association and also those outside the Association who have not already signified their intention of joining the Labour Commission will do so before very long.

Scientific Officer.—It was decided that the services of the Scientific Officer be carried on for another period and it was also considered that in addition to the Scientific Officer, the U. P. A. S. I. should have the services of a Mycologist and the Planting Member was asked to try and press this forward.

Fertilisers and Guarantees.—It has been proved that a tremendous percentage of insoluble matter has from time to time been sent out with Fish Manure supplied to planters. One sample analysed by Mr. Anstead contained as much as 34·04 per cent. of insoluble matter. Mr. Congreve brought up a resolution which was carried asking that the U. P. A. S. I. approach suppliers of Fish Manure and ask them to guarantee in future that the insoluble matter shall not exceed 5 per cent. and that the members of the U. P. A. S. I. give preference to Firms who give this guarantee. At the same time it was pointed out that there should be no appreciable increase in cost.

Railway Freights on Tea Seed.—A resolution was passed asking the U. P. A. S. I. to approach the Indian Tea Association asking them to use their influence to obtain concessions in rates of Freight on Tea seed from all Railways in India.

Finance.—As you are aware, we are paying subscription to the U. P. A. S. I. at the rate of 2 annas per acre and you instructed us to ask that all Associations pay on this basis. Mr. Wilkie brought this up and during the discussion on the subject of subscriptions, the Chairman said that he hoped all Associations would come in on this basis and said that, when those Associations not at present paying the 2 anna cess could afford to come in on that basis, they would do so. All Associations are now in this basis with the exception of two.

In conclusion, Gentlemen, I wish to thank you for the honour you did us in electing us as your Delegates.

Mr. Leahy proposed a vote of thanks to our Delegates and to Mr. Roissier for his interesting Report. Seconded by Mr. Ellis and carried with applause.

Labour Commission.—The following Resolution was proposed by Mr. Westaway: "That the majority of the members of this Association approve of the proposed Labour Commission and will support it. The support of 4,138 acres being promised." Seconded by Mr. Roissier.—Carried.

Sessions Judge, Kottayam.—The Chairman drew the attention of the members to the recent judgment given by the Sessions Judge of Kottayam and published in the papers under the heading of "Slavery in the Travancore Highlands" and said that he thought that notice should be taken of this judgment. After much discussion on the subject the following resolution was proposed by Mr. Westaway: "That this Association would like to draw the attention of the Travancore Government to the uncalled for remarks made by the Sessions Judge, Kottayam, in his judgment in the so called Slavery Case in the Travancore Highlands, as no such state of affairs exists except in his imagination, and we would welcome the appointment of an independent commission of enquiry by Government to prove that the accusations are absolutely unfounded. Copies of this resolution to be forwarded to the British Resident, the Dewan of Travancore, the Planting Member of Council, and the Sessions Judge, Kottayam."

Seconded by Mr. Winterbotham and carried unanimously.

Resolution by Mr. Leahy.—"That Government be asked to convert the present Travellers' Bungalow in Peermade into a first class Travellers' Bungalow." Seconded by Mr. Ellis and carried unanimously

With a vote of thanks to the Chair, the Meeting terminated.

(Signed) REGINALD P. ROISSIER,
Honorary Secretary.

An Electric Rubber Tapper.

A novel electrical tapper for rubber trees is the work of a German in Peru. Hollow iron channels, divided into sections, are fitted on the tree trunk, the sections containing pricking devices that can be worked at varying times by current from the central station. A receptacle in each section catches the latex, coagulating it with acid. The attachment may be left unvisited two or three months, and in the time 200 or 300 lumps of rubber may be accumulated from a large tree.—*The Queensland Agricultural Journal.*

Colombia's Export Tax on Rubber.

The Board of Trade are in receipt, through the Foreign Office, of information to the effect that an export tax at the rate of 7 per cent. ad valorem has been placed on rubber exported from the Republic of Colombia.—*The India-Rubber Journal.*

CORRESPONDENCE.

Terramia Estate,
Kallakamby, P. O., 3/11/13

THE EDITOR,
The Planters' Chronicle,

Sir,—Would Mr. Mead regard the subscription to the proposed Labour Commission as a Labour Insurance Premium?

He writes that he personally believes that a district such as his will never be short of labour; well a few years ago many planters said the same of our district, the Nilgiris, on account of local Badegas, but we *are* feeling the shortage now as some of our "Locals" are going further afield, bribed by large advances and as things are at present there seems very little chance of improvement, rather the reverse, so might not Mr Mead's labour be tempted also and might he not have to increase advances, or pay, or both to keep them?

Even if the Labour Commission costs us an *outside* figure of Rs.4 per acre, it only means 5 annas per month extra per coolie at one coolie per acre, and we have had to face a larger rise than that *more than once* recently.

On the average Tea production in South India it is (at Rs. 4 per acre) under one cent per lb. of made Tea and one could easily make that up if you got back the same picking and pruning coolies year after year and if we can regain for our maistries and kanganies but half of the authority they have lost by ill-regulated competition during the last few years.

Well supported, the Labour Commission would cost less than the equivalent of a one anna per month rise in wages, a very small premium to pay if it saves us raising advances or rates, and surely the safeguarding of advances is almost worth the premium asked.

I personally think that if it was put as a *Labour Insurance* scheme, it would appeal to most proprietors and shareholders; any how its a good enough gamble (?) for.

Yours faithfully,

A. S. DANDISON.

We are very strongly of opinion that the South Indian Planters should have a prescriptive right to the labour on their coast; and exclusive right is a somewhat different matter. We cannot pretend to speak for the South Indian planters;—if we may judge from the *Times of Ceylon*, they are not always reasonable in their demands—but all the Eastern Bengal planters want is a fair field and no favour and an absolutely impartial and indifferent action on the part of the Government. This is not the case at present. Every facility is given to recruiters for the Colonies, every possible obstacle is placed in the way of recruitment for Assam. Whether the Madras Government adopts a similar attitude in favour of Ceylon and the Straits to the detriment of the South Indian Planter, we cannot say, but we should not be very surprised if we heard that they do.—*Capital.*

AGRICULTURE.

Explosives in Agriculture.

We take from the *Queensland Agricultural Journal* one of two articles that have appeared lately on the subject of Explosives in Agriculture, which should prove of interest and of aid to those contemplating the use of explosives in opening up new land, and the information comes with added force as imparted by one who has tried it over an extended period of years. We are given to understand that experiments will be undertaken by the Scientific Assistant in Mysore, and we trust that the results of those Experiments will be sent to us for publication.

By F. R. Treleaven, New Farm, Brisbane.

From a thorough study of the above and experiments carried out covering a period of the past eleven years, I have formed the decided opinion that explosives have come to stay, and play a most important part throughout the agricultural world—a fact which the farmers of Queensland should not overlook; the aim being to combine efficiency with economy in bringing explosives into use in land-clearing, and thereby making a saving of from 40 to 50 per cent. as against hand labour, and it has been proved in many cases that a saving of from 100 to 200 per cent. has been accomplished. The efficiency of explosives on the land I have thoroughly tested, and successfully demonstrated as to their value on sub-soiling (a most important part) the splitting of logs for burning and fencing purposes, the cutting through of logs for rolling together to burn, the cutting of water ways, and the draining of land in letting through surface water where practicable.

The first consideration for the farmer is the removal of standing timber and stumps, so that the plough may be brought into use and enable him to get returns as expeditiously as possible at the least cost; and this can be accomplished with the aid of explosives, thus saving a great deal of hard labour.

Kinds of Explosives.

There are different kinds of explosives that are brought into prominence in land-clearing, all of which have their merits more or less; and I may say that I have demonstrated practically with all of them, and it rests with the user to decide which particular ones he should make a careful study of, that he may get the best results at the least cost. For myself, I use both nitro-glycerine and chlorate compounds. It all depends on the nature of the timber and soil; if wet or dry, and by combining both with careful study and results obtained, one gets very near the mark, but to judge to a plug or two in heavy shooting is out of the question-experience teaches. The tools I use consists of a ⅞ in. steel bar drill, chisel-pointed at one end and diamond-pointed at the other, a draining spade, and a wooden rammer for tamping with earth. If blasting with gelatine or gelignite, I use water tamping-that is, if it is near at hand and the ground will hold it, which it will do sufficiently long enough if the timber is green, but should the timber be dry the water tamping gets away more rapidly should the soil be of a soft nature.

In stumping with gelignite or blasting gelatine, take, for instance, a stump 4 feet in diameter. It may be necessary to make from three to four or six holes under the main roots—that is, to make a clean job of it—and distribute the charges according to size of roots. Should the stumps have a tap root, there is no necessity to bore into it with an auger, that the root may be broken off, as it can be cut off with the explosive, thus saving labour. The experience I have gained in stumping with explosives enables me to see where the charges should be placed under the stump, and to get at this I use the draining spade and small bar. The holes may be from 4 in. to 6 in. in diameter, so that you can see where a charge is going to; whereas, by the method of boring under stumps with the auger, one is working in the dark; and another disadvantage is, the explosives placed in the auger-hole do not get the opportunity of doing their work effectually.

STUMPING WITH RACKAROCK.

This may be effectually carried out with one hole only, with the charge placed under the centre, this being the main point. The rending power of chlorate explosives is far greater in heavy shooting than that of nitro-glycerine explosives, for the reason that chlorate explosives retain their energy for a longer period.

METHODS OF FIRING.

There are two methods of exploding charges; First with a safety fuse; and the other by electricity. The first may be adopted where only one shot is necessary; but where more charges are required, and these distributed under a stump and fired simultaneously, the electric fuses and battery are used. This method of firing causes no misfires, providing the connections are perfect.

SAFETY FUSE.

A good fuse should be reliable. It may be set down at as burning at the rate of 2 ft. a minute, which allows the operator to retire to a safe distance. In preparing the charge, tie the plugs together. Take the detonator and shake all sawdust out of it, for if this is not done a misfire might occur, and even if this does not happen there is a possibility of the sawdust smouldering, in consequence of which there may probably be an accident. In inserting the fuse into the detonator, cut the fuse straight across; and in starting on a new coil, cut a few inches off before use. In crimping the detonator on the fuse, use proper pliers designed for the purpose. When firing in water, make the cap water-tight by smearing brown soap or fat around the neck of the cap. When inserting the fuse into the detonator, do so carefully; likewise when fixing the detonator into the primer, and don't press home on the fuse. Hold the top of the cap, and tie it firmly into the primer; otherwise it may come adrift in the tamping, Don't turn the fuse along the side of the charge, as it may or may not cause the charge to start burning. The length of fuse required may be cut off after the tamping is completed. Use a piece of stick in making a hole in the primer to receive the detonator. In handling explosives, treat them as such, and go about the work quietly, remembering that the best results are obtained by sound judgment.

FIRING BY ELECTRICITY.

Those who intend to work with explosives should procure an electric outfit, as it renders the work practically safe as far as it is possible to do so. The outfit is the following:—

A magneto exploder;
Electric fuses (low tension);
Insulated cable; and
Connecting wire.

BLASTING TREES.

In blasting trees, do so, if possible, on a windy day, trusting to the wind to drag out some of the roots, thereby saving explosives. To clear country economically, make good use of fires if the tree is dead, and should it not fall, a fire will bring it down before morning, and some trees usually burn well standing. The same applies to stumps. Don't shoot them right out of the ground, but just give them sufficient to lift them, say, 18 in. to 2 ft., splitting them in halves or quarters. Then the fire will do the rest, and save a lot of snigging, which would be necessary if stumps were blown all over the place. Explosives cost money, but used as they should be used, they save money and time and bring quick returns from the land.

Log Splitting and Cutting Off.

The only tool necessary is a 1½ in. auger for logs up to 4 ft. in diameter, using gelignite or blasting gelatine. Holes from 8 to 12 ft. apart are bored on the centre from the top of the log. This refers to clean running timber, giving each hole two plugs. Should the timber be hard and curly, use a 2¼ in. auger, and bore to a depth just beyond the centre of the log, so that the charge, when placed, will be in the exact centre of the log. This auger-hole will take five plugs of 1 in. gelignite, side by side, which is sufficient to cut the log through; and the lengths so cut off may be rolled together for burning. A complete outfit of augers for the above work would be—one each of 1½ in., 1¾ in., 2¼ in., using your own judgment, according to size of timber, as to which auger to cut off with. The cutting off can be done with ordinary fuse. For splitting use the battery on the line of holes along the log.

Subsoiling.

This is a most important part that explosives play for the benefit of the farmer. The cost is a mere bagatelle in view of increased crops. Subsoiling should not be attemoted when the ground is wet—take the dry weather for it. In damp ground and in certain soils, the explosive tends to harden and pug the soil where the explosive has spent its energy on the outside limit; whereas in dry ground the force of the blast runs out a greater distance, and loosens up on a nice even basis. The depth of the holes varies from 2 ft. 6 in. to 1½ ft., according to "the nature of the soil". This also applies to the distance the shots should be apart, which may vary from 7 to 18 ft., and the quantity of explosive used may be from a half to two plugs, say, of gelignite. A farmer, in subsoiling, should take the class of explosive he intends to use, make two or three trial shots, and then use the crowbar adjacent to the explosion, which will give him a good idea of the distance to which the charge has penetrated. Don't expect to see a great upheaval of the soil. This is not what is required. The ground should have the appearance of having been on the boil, and thus settled and shaken up, This is what is required; so study the subsoil, which is the home of the roots and source of plant food. Farmers should not get the idea that their farms are impoverished through years of cropping, for they have only scratched the surface soil by ploughing. Country that has been under crop for twenty years can practically be restored to its virgin state with the aid of explosives; so do not dispose of the farm with the idea that you have taken all the good out of the land. It is far from it. Subsoiling means:

The utilising of the fertilising elements of the subsoil;
Storage of rainfall;
Good drainage;
Atmospheric influences penetrate the subsoil;
The roots obtain their nourishment from it;
Destruction of field mice, &c.;
Advantage of getting sooner on to the land for cultivation; and
Bountiful crops.

CO-OPERATIVE RUBBER FACTORIES.

How to Standardise Plantation Rubber.

Dr. Lyne Expounds His Scheme.

Interviewed on the subject of the standardisation of plantation rubber Mr. R. N. Lyne, Director of Agriculture, in the *Times of Ceylon* of the 29th ultimo, advocated the application of a system of co-operation and suggested the establishment of central factories in which coagulated latex could be creped in one uniform quality. In view of those remarks the following article from the pen of Mr. Lyne, which will appear in the forthcoming issue of the *Tropical Agriculturist*, will be found interesting:—

The Standardization of Plantation Rubber.

The depression in the plantation rubber market has given rise to a serious situation notwithstanding the fact that there would seem to be grounds for believing that the great disparity between Plantation and Para is to some extent at least artificial. The wild Landolphia rubber of East Africa is collected as scrap by natives, who work in the forests without any supervision. It is rolled into balls or 'sausage' and in the process of rolling collects bark, sand and other impurities, which, however, are not washed out. The writer on one occasion picked at random out of a merchant's godown a sample of sausage, such as is now being quoted at a premium of a penny or two pence over our best plantation sheet, and by merely soaking it in a tub

Reduced Its Weight by 14 per cent.

through loss of sand. It is impossible to believe that our clean biscuit and sheet can for long occupy a place of inferiority to this impure forest product. This Landolphia rubber industry of the East coast is in the hands of Indian traders, who purchase the rubber from native collectors whom they have previously financed. Some of their profit is derived from goods provided to the collector, who does not take out all his emoluments in cash but keeps up a running account. The price at which traders purchase varies according to the wages prevailing in the particular locality. It may be a rupee a pound or one rupee and a quarter or a half. The practice in one place which the writer can recall was to place pice (copper coin) in the scale against rubber; a rupee's worth of copper coin weighing a pound. The rubber is seldom, or one may say never, dry when brought in, so that the trader must always allow for loss; sometimes indeed it is soaking wet. It its safe to assert that the best grades of East African Landolphia—Mozambique sausage and Lamu ball—cannot be placed f.o.b. under Rs.2 a lb. Ceara Scrap, the produce of the German East African plantation, costs about the same amount. This class of rubber has

Suffered a Decline of Only 6d.

from the corresponding period of last year and Landolphia a decline of 1/1 to 1/4; plantation sheet having in the same period dropped 1/11½ to 2/2½. Neither Landolphia, as we have indicated, nor yet Ceara can compare in cleanliness with Plantation, but they are both now priced higher. In one respect they surpass Plantation—the quality does not vary. Mozambique sausage, whether from Inhambane or Beira, is always constant in quality and the same may be said of Lamu ball, whether from British or German East Africa. Rubber can be produced in Ceylon cheaper than in any other country in the world, so that we may take it that, unpleasant as the present condition of things is, the industry in this country is not at the present moment threatened with disaster. But at the same time the situation is one that demands serious thought and if it leads on to improved methods it will not have come in vain. One thing seems necessary and that is to give Plantation that one quality which it now, alone of all rubbers in the world, lacks, namely,

UNIFORMITY.

The precise steps required to accomplish are now being studied by the Department of Agriculture, but the scheme of research will need to be well supported if it is to bear good fruit, and this brings us to the consideration of a second step that would seem no less called for, that is to say, co-operation. At the Ninth Congress of the International Co-operative Alliance held in Glasgow on August 25th, there were 600 delegates representing over 20,000,000 members of 130,000 societies. Lord Grey delivered the Presidential address and in the course of it said :—"What is the nature of the benefit which the application of the co-operative principle to our industrial system claims to offer to the people ? The application of the co-operative principle to our industrial life has proved in England, the United States, France, Germany, Denmark, and Ireland, that, by the substitution of organised distribution for unorganised distribution, by the substitution of co-operative buying for individual buying, of co-operative transportation and marketing for individual selling, and of co-operative use of power for the individual use of expensive machinery, the wants of both producer and consumer can be met more effectively, and at less cost. In this way it secures to the consumer a reduction in the cost of living and a greater command of, not only the necessaries, but the comforts and conveniences of life a most material consideration in this age of rising prices. And to the producer it secures a substantial increase in the amount of net profits available for distribution, or, in other words, an increase of that fund from which alone can be drawn those higher wages which we all desire to secure for the underpaid workers of the civilised world. Co-operation means the elimination of every unnecessary middleman. Every middleman not required by a wise and practicable system of co-operative organisation cannot be regarded in any other light than that of a parasite. The vital interests of society call for his removal, and co-operation shows how he can be removed. The principle of co-operation requires that the services of every necessary middleman shall be adequately and honourably remunerated, but it also requires that every unnecessary toll taken from an article on its way from the producer to consumer shall be removed." These words are worth pondering over. We may take it that all agree that plantation rubber would obtain better consideration if it were standardized—that is, if it were of even grade like Danish butter. Standardization can be effected in two ways—one by all plantations adopting a set system of preparation proved to give the best results after vulcanization; the other by planters ceasing to manufacture rubber and confining their operations solely to the coagulation of latex; the subsequent preparation to be carried out in a few large central factories. It is by the central factory system that the dairy industries of the Dominions have been built up and that Australia and New Zealand can now place butter and cheese of uniform quality on the London market. It could never have done this if each dairy farmer had insisted upon manufacturing his own produce. The frozen mutton industries of New Zealand and the Argentine have been developed on similar principles. We don't suggest that co-operation need stop at preparation but we certainly believe the industry would be lifted to an altogether different plane if co-operation were adopted even to this extent.—*The Weekly Times of Ceylon*.

Contact between Planter and Specialist.

(AGRICULTURAL NEWS, WEST INDIES).

Nobody at the present day can fail to appreciate the enormous gulf that divides the practical man or capitalist from the specialist in science. The separation of the two positions is very patent in modern agriculture, and can be vividly realized by contrasting the mental outlook of, say, the manager of a large sugar estate, and that of the entomologist whose faculties are concentrated on the wing markings of half a dozen species of insects. It is obvious that a proper relationship, or rather a proper communication or contact between the two is of the very greatest importance, and it is the object of this article to delineate the position of the specialist, and to point out the methods that are, or should be adopted, in order that his activities may be utilized to the best advantage.

In most of the progressive agricultural communities in the tropics will be found to exist departments (boards, or else entirely non-official agricultural organizations, which employ the services of scientific specialists—agricultural chemists, mycologists, entomologists and the like.) Strictly speaking—the matter will be enlarged upon later—these so-called specialists are not pure specialists, for in many cases they possess a good general knowledge of agriculture; yet in spite of this, their work is sufficiently restricted to narrow lines of investigation to render their mentalities quite different to those of practical planters. In order to contrast clearly the two types, it will be convenient to adopt a figurative illustration. The ability of the specialist may be considered as being represented by a long, narrow, verticle rectangle—his knowledge is deep rather than broad. That of the practical agriculturist can be symbolised in the shape of a square—his knowledge is of a normal nature and quite unspecialised. Clearly these two figures may be equal in area, but the essential feature of the conception is that the two figures are so dissimilar in shape that they cannot be made to fit when placed side by side. Occasionally, as already hinted, where the specialist has received a general training, and also in a case where the practical agriculturist has received a special training, the resulting figures have more in common, and may fit fairly well. This ideal condition is seldom found, however, and at present it is generally necessary in tropical communities to have an organization at the back of the specialists, of which the main function is to connect up the two dissimilar types just described.

It is evident that the knowledge of the specialist is a source which must be tapped. In spite of departments and other organisitions there is a strong tendency in the tropics to-day, for men who were originally specialists to have so acquainted themselves with the point of view and the requirements of the practical planter that they have become practitioners in the branch of science in which they are interested, and this is frequently followed by their becoming established in purely administrative positions where they direct the work, and disseminate the results to younger specialists who follow in their wake. The necessity for feeders of knowledge is greater than the necessity for producers of knowledge. This peculiar and most important trend is not altogether desirable, for it leads to the loss of research men just as they are in possession of valuable experience and in a position to tackle local problems deftly and with assurance. In fact, to-day we find the pure specialist more or less confined to the great centres of learning in temperate countries. There is need for more of these men in the tropics; but, until tropical public opinion better appreciates the value of abstract research by learning how to tap it, there is little prospect of such a change being brought about. In medicine, to strike a parallel contrast, the value of the specialist is clearly understood. The significance of a serious affection of the eye or of the throat for instance, is at once appreciated, and information is obtained by intelligent people at the right time and from the right authority. On the other hand, of course an occasional ailment of these organs may be treated without the aid of skilled assistance. Judgment is exercised. In agriculture, a similar attitude is very uncommon. In agriculture the tendency is in the direction of *laissez faire*: unless the specialist rises from his microscope and searches for something to treat, results will be wasted. His mind, however, by interruption, is taken off his work, and the results have to suffer in any case.

The solution to these difficulties lies mainly in the fact that education and research should go hand in hand under proper conditions. At present there are too many isolated attempts at research in the tropics and not enough in the direction of broad education. The research man should be allowed to teach the young generation he will later advise

Agricultural education has from time to time been subjected to considerable ridicule by practical agriculturists, even by those who have received one. That is because it has not been correctly administered. Education in agricultural science should have for its main object the teaching of where, when and why to apply for advice, and not aim merely to instil isolated facts and operations or to train specialists. The student who intends to cultivate land should not, for instance, be taught how to analyze a soil, but rather under what conditions a soil should be analyzed and the usefulness of the results.

Consequent on such a widening of the practical man's square—to speak again figuratively—his contact with the specialist will be increased without interfering either with his own particular depth and kind of information or with that of the specialist. It is true that specialization might progress, under such conditions, more rapidly than the practical man could keep up with, in which case the class of scientific practitioner already referred to, would quickly evolve; but it would be from a different cause, a more desirable cause than that which necessitates the combination of agriculturist and scientific specialist in one, at the present day.

With the extended appreciation of scientific results by the agriculturist, the necessity for a large number of agricultural departments would tend to diminish. The State would be relieved of responsibility. Taxation would be less. The planter does himself what he paid others to do. Men of administrative ability would be required in the various communities to direct local co-operative movements it is true, but they would be entirely unofficial. *A priori*, one other thing would be necessary. Those who intended to undertake the cultivation of the land, who did so with the fixed intention of discreetly utilizing the knowledge of the specialist, would need to be catered for by the establishment of an inexpensive and easily accessible tropical agricultural university.—*The Hawaiian Forester and Agriculturist.*

How to take Samples and send Specimens for Examination.

Soils.

To obtain a fair average sample of the soil in a field for analysis, as nearly as possible equal quantities of soil are taken from not less than four different parts of it. At the places chosen for taking samples the surface is lightly scraped, to remove leaves mulch &c., a vertical hole 18 inches square is then dug to a depth of 2 feet, like a port hole. With a sharp spade a slice of soil to a depth of one foot is cut off one side of the hole and placed on a clean bag. Big stones and big roots should be removed, but not small stones the size of a pea or fine roots.

The process is repeated at the other places selected, and all the samples are then thoroughly mixed, big lumps being broken up. After well mixing about 10 lbs is placed in a clean canvas bag, which is securely tied up. Such samples should be forwarded in a clean wooden box.

It is important that bags and boxes should be clean.

Care must be taken about the labels. Each sample should be labelled and a duplicate label put inside the bag. Full information should be sent about each sample, stating elevation, rainfall, depth of soil, nature of subsoil, surrounding rocks and country. whether and is on a level or slope near a river, &c, and the history of the previous manurial treatment of the soil.

The same rules apply to taking samples of a sub-soil

Plant Diseases.

These should be packed so that if possible, they will arrive in the same condition in which they were collected, and they *must not be externally wet* when they are put up In some cases the specimens may be dried between sheets of blotting paper under light pressure before they are packed

Specimens which decay rapidly may be sent in a solution of Formalin, 1 part in 20 of water.

Insects.

If live insects are sent. some of their food plant which should be *dry* should be enclosed with them. and also a little crushed paper. Insects found in soil. wood, &c., should be sent in these materials

Tin boxes should be used for packing, and holes should not be bored in them or if they are only one or two and these quite small.

Insects should usually be sent dead. They may be killed in a cyanide bottle. or enclosed under a tumbler with a small piece of blotting paper soaked in benzene They should be *quite dry* when packed, and are best buried in dry sawdust with a little powdered naphthaline

Small insects should be packed with finely shredded paper. *Cotton wool should never be used.*

Butterflies and moths should be enclosed in papers folded into triangular-shaped packets which are packed in a box with crushed paper to prevent shaking.

Scale insects should be packed *quite dry*, each specimen attached to its food plant simply wrapped in soft tissue paper.

General.

In all cases more than one specimen of each kind should be sent, if possible 4 or 5.

Every specimen should be clearly label'ed so that there can be no possible mistake. The label should bear a number referring to a description in the covering letter.

Full particulars about all specimens sent must be recorded.

All specimens should be sent to

THE SECRETARY,
The United Plan'ers' Association of Southern India,
BANGALORE,

to ensure their being promptly attended to upon arrival.

The Planters' Chronicle.

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Contents.

The Planting Expert being still away on tour, we are deprived of those valuable and interesting papers which weekly add so much to our paper. We hope that on his return he will be able to add to our stores of knowledge, and describe for us what must be a very practical tour.

We publish an article on the Digestive Juices of Plants which shows how similar are the digestive properties of both plants and animals.

We should like to have, from anyone who has cultivated the Soy Bean, the results of any experiments undertaken, as the Director of Agriculture, Ceylon, does not predict any great success from its cultivation in the Tropics by European planters,

A further statement on Explosives in Agriculture, which gives more details than we have hitherto printed, especially as regards the cost of the different charges at various distances which do not appear prohibitive. We know that the effects are lasting and beneficial. Those who are inclined to make the experiment should carefully read the para dealing with the preparation of the charges, the several "Don'ts" and the advantages of sub-soiling.

Mr. Cyril Baxendale always has something interesting to say of Rubber, and we publish a lecture given by him on Rubber Planting in the British Empire. The total acreage under rubber is upwards of 1,000,000 acres, and expansion, considering the short time since its cultivation was seriously undertaken, is almost incredible. A gentleman, just out from Home, tells us that it is hoped that Rubber will go to 3 shillings a pound. The introduction of the new Tariff in America may have a good influence.

The extract from the Consular Reports on the quantity of Tea exported, and the continued and increased popularity of Tea in the United Kingdom and Russia must be pleasant reading to Tea planters.

We trust that *Commerce* is right in assuring us that the prospective Brazil crop is a short one, and that visible stocks are diminishing, which should bring hope and consolation to coffee planters, who have so many evils to contend against.

THE DIGESTIVE JUICES OF PLANTS.

It has long been known that both plants and animals carry on their various chemical operations by means of specific agents known as enzymes. Thus, when a plant requires the starch which is stored in its leaf, tuber or elsewhere, a special enzyme diastase, is put in contact with the starch grains, corrodes them, and converts the starch into sugar. The mode whereby the animal makes use of the starch which occurs in its food is precisely similar to that employed by the plant. Both saliva and pancreatic juice contain diastase, and hence such starch as escapes the action of saliva—and in these days of quick lunches much escapes and is acted on by the diastase of pancreatic juice and is hydrolysed to sugar. Each of the many chemical actions which go on in the body is presided over by a specific enzyme, of which the starch-converting diastase may serve as an example. The digestion of proteins--the complex nitrogen-containing substances which are of special nutritive value—is effected by stages, and for each stage there is a special enzyme. In the animal these proteolytic enzymes are contained in the gastric and pancreatic juices. Since the processes of digestion are similar in plants and animals, we shall expect to find that proteolytic enzymes occur in plants as well as in animals, This expectation was realised long ago by the classical investigations on the substances excreted by insectivorous plants, such as Drosera and the Pitcher plant (Nepenthes). These substances bring about the solution of proteins in a way similar in all essentials to that whereby the proteolytic enzymes of animals act.

The fact that the protein-digesting enzymes of plants are readily demonstrable in the case of insectivorous plants. is apt to give rise to the idea that their occurrence is exceptional and bound up, in some special way, with the curious and uncanny habit of Nepenthes and Drosera. This, however, is not the case. What happens in these happens in all plants, and the only peculiarity of the insectivorous plant is that it produces—in accordance with its special habit—a relatively large, and hence readily recognisable, amount of proteolytic enzyme.

In passing, it may be pointed out that the insectivorous habit of Drosera is the expression of a device for satisfying "nitrogen hunger." The insectivorous plant lives in situations in which the amount of available nitrogen is low. It runs the risk of nitrogen starvation and overcomes that risk by an exiguous diet of flies. Leguminous plants, as is well known, save themselves from similar starvation and satisfy their nitrogen-hunger by first permitting nitrogen-fixing bacteria to take up a lodgment in their roots, and then by digesting the lodgers and all their stores of nitrogen.

The formation of proteolytic enzymes by the insectivorous plant is therefore to be regarded only as a special case of a general phenomenon, and that this is so is evident from the fact that similar proteolytic enzymes occur in considerable quantities in many other kinds of plants. They have been extracted from the Papaw, the Pineapple, the Fig, the Paper Mulberry (Broussonetia papyrifera) and many other plants.

The only reason why similar enzymes cannot be obtained readily from every plant is because plants are economical beings so far as the use of nitrogen compounds is concerned. They make a little go a long way, and hence they only require minimum quantities of the agents which change and dissolve the proteins.

Nevertheless, recent experiments by Messrs. Gerber and Guiol (*Bull. Soc. Bot. de France* 59, 1912) have brought to light the somewhat surprising fact that the enzymes of certain plants are much more powerful than those of animal origin. Thus, a mixture of diastatic and proteolytic enzymes, which may be obtained easily from the latex of the Fig (Ficus Carica) is shown to act on protein twice as vigorously as pancreatin which is of animal origin.

Again, from the latex of the Paper Mulberry a similar mixture of enzymes is obtained; in this case, although the proteolytic enzyme is only equal in activity with one of animal origin, the diastatic enzyme is ten times more active than animal diastase.

Finally, it need only be added that the fundamental importance to the plant, of these and other enzymes lies in the fact that chemical processes, which, without their co-operation, proceed only slowly and at high temperatures, are made to take place rapidly at the comparatively low temperature in which the plant lives. By their means stores of food laid down in the root or in the wood or elsewhere are rapidly mobilised in and put at the service of the burgeoning tree, and by this act it is that the transformation scene of spring is as amazingly rapid as it is supremely beautiful.—*The Gardeners' Chronicle.*

CULTIVATION OF THE SOY BEAN.

NOT SUITABLE FOR CEYLON.

The cultivation of the soy bean has bean tried in Ceylon for a sufficient length of time now, and the verdict is that it is not suitable for the island. The opinion of the Director of Agriculture expressed to our Kandy representative, is that it will never succeed in Ceylon; that is, that it will never produce the weight of crop per acre that it does in temperate climes. The soy bean, it will be remembered, took some time to adapt itself to the soil of Ceylon. Only a small percentage of the seeds originally put down by the Agricultural Society in the school gardens in different parts of the island germinated, the failure of the greater number being due to the lack of the required bacteria in the soil. By continued growing, however, and consequent inoculation of the soil, it became possible to cultivate the bean on a fairly extensive scale. The soy bean has now been three years under trial, and the opinion is that, so far as Ceylon is concerned, it is not worth cultivating. The opinion of the Director of Agriculture is that it

WILL NOT SUCCEED IN THE TROPICS

and that it will not yield as well as it does in Manchuria. He had had experience of soy bean cultivation in Zanzibar and Portuguese East Africa, where it did not prove successful, and the same might be said of Natal, where it is being tried somewhat extensively. Annuals, like the soy beans, will never pay the European to dabble with, says Mr. Lyne. He did not know of any oil-producing annual in the Tropics which would pay a European employer of labour to cultivate. The soy bean, he thinks, is one of those products that should be left to the native. It is altogether a peasant industry.—*The Weekly Times of Ceylon.*

EXPLOSIVES IN AGRICULTURE.

(Extract from a Paper by H. C. COGGINS, in the "Agricultural Gazette" of New South Wales.

It is remarkable that, of many trials made in Queensland for the removal of trees and stumps and for subsoiling by the use of explosives, none or very few appear to have been successful. The latest report we had from an experimenter was that he had placed 31 dynamite cartridges under a stump of no great dimensions and had exploded them without the slightest effect on the stump! Another informed us that he had charged a line of holes with a view to subsoiling the ground. In this case the holes had merely acted as gun barrels; the surrounding soil was neither shattered nor even crushed. In other States the experiments appear to be successful almost everywhere, as will be seen by the following instances recorded in "Garden and Field," an excellent and reliable journal published in Adelaide:—

A demonstration of the usefulness of explosives for removing trees and stumps, ditching, and subsoiling was given at Mount Barker recently. The test was reported in the "Advertiser" (S. A.) as follows:—The first stump chosen was a pine of about 30 years' growth. Evidently, the soil and climate are eminently suited for the growing of pines, for this stump, 2 ft. above the ground, was 10 ft. in circumference. A hole was bored in the ground towards the tap root with a 2-in. auger, and 30 plugs of gelignite were inserted and fired. This was repeated on the other side of the stump, and although the earth was removed from underneath, the tentacle-like roots still held the stump in place. These roots, which ran almost horizontally from the stump. were then operated on. With a 1-in. auger a hole was bored into each root, and one plug of gelignite was placed in each hole; then all were simultaneously fired. Upon examination every root was found to be completely severed, leaving the stump ready to be hauled. The next stump was about the same size, but the experience gained in the first saved money in the second. In this case the operations were reversed; the tentacles were cut by gelignite, then three holes under the stumps were charged and fired simultaneously. Spectacularly and financially, the effect was grand. One portion of the stump, weighing over 2 cwt., was blown at least 50 ft. into the air and fell 120 ft. from the place of explosion, the rest of the stump being removed many feet.

The unbelievers were completely won over by the signal success of this experiment. The whole cost for gelignite, fuse, detonators, and time was as near as possible 7*s.* The general opinion among the onlookers was that the stumps would have taken one man one and a-half day to grub. A blackwood tree, 25 ft. high and 50 in. in circumference, was blown out of the ground, after about 10 minutes' work, at a total cost of 2*s.* The effect was then shown on growing red gum trees, ranging from 45 ft. to 63 ft. in height and from 4 ft. 6 in. to 7 ft. 6 in. in circumference. It was surprising how quickly, simply, and cheaply these trees were taken out. The preparations for the largest of these gums took only 10 minutes, and at a cost of 3*s.* the job was done. The smaller trees took about the same time for preparation, but the cost in each case was lessened by 6*d.* to 9*d.* per tree.

For ditching, dam-sinking, and general excavation work, explosives must in the near future be very greatly used. The holes for the ditching experiment were prepared by novices, but were not properly placed. The proper position is zigzag fashion the holes to be 2 ft. apart in a straight line. A plug of gelignite was inserted in each hole and fired. The explosions caused the ground to fly, and, as a result, all along the line of fire it was broken up to a depth of 3 ft. or more, making the removal of the loosened earth a matter of simplicity.

For subsoiling proper, a new powder of Australian manufacture was used. This was fired by means of a primer in the shape of a third of a plug of gelignite with the detonator. The holes were bored 2 ft. deep and 10 ft. apart, and the charge inserted and fired. Little result was apparent on the surface (except in the case of one hole, where a double charge was placed for experiment); but below, the ground was broken in all directions, the cracks extending from one hole to the other. At the actual spot of the explosion a spade could be driven down to the handle. For those who contemplate planting trees of any kind roses or shrubs, preparation of this nature is advised for three reasons-*viz.*, time saved, money saved, and the roots of trees or shrubs get no check in their growth.

Again in the May issue of the "Agricultural Gazette" of New South Wales, at the conclusion of a Paper in "Subsoiling by Explosives," by H. C. Coggins, we find the following remarks and advice on the method:—

When one is asked to consider any new proposition appertaining to farming, the first thought is:—What is it going to cost? This most important item I shall deal with later, except for saying here that I have carried out a number of demonstrations in subsoiling with explosives in different parts of the State, and on different soils, and I find that subsoiling with explosives is by far the cheapest and best. One man can do the whole of the work; no horse and plough are required, only a few tools, consisting of one 2-inch bull-nosed auger, one tamping rod, and one pointed crowbar.

The explosive I use, and would recommend, is gelignite or blasting gelignite; it is handy, less dangerous, and not expensive.

In deciding to subsoil a paddock, the strength of the ground must first be ascertained, and a test hole is put down, about 2 ft., to get this. One must not expect to see an upheaval; this is far from what is required. If the earth is displaced to any extent, it shows that the charge is too strong and is liable to bring the subsoil to the surface; this must be avoided. As a general rule, I test with one plug, and, usually, I find this sufficient for good work. Of course, some soils required only halt a plug; it all depends on the nature and strength of the subsoil and hard-pan.

After getting the strength of the ground, go ahead; bore the holes early 10, 15 or 20 ft. apart, according to the strength of the subsoil, and about 2 ft. or 3 ft. deep.

PREPARING THE CHARGES.

In preparing the charges it is necessary to use ordinary care and common sense; otherwise they may hurt. In cutting the fuse, cut square across the face, not slanting and allow about 4 in. to project above the ground; insert the fuse into the detonator, making quite certain that no sawdust packing remains in the cap. Be careful not to push the fuse well home. Leave a space between the conical-shaped cap, which contains fulminate of mercury, and the end of the fuse. Crimp the detonator on to the fuse at the end of the cap, and use the proper crimper for this purpose. Do not bite it on; it might bite you.

Gelignite is in a soft condition like soap. Bore a hole in it with the handle of the crimper, specially designed for the purpose; insert the detonator and tie the end, paper and all. This keeps the cap from slipping out. Lower the charge into the hole; tamp gently at first. but more strongly as the surface is reached, making the hole compact and tight, which is very important to get a good result. Then cut the fuse in a slanting direction and insert a small piece of gelignite. This will save matches and temper, if there should be any wind about.

As the fuse burns at the rate of 30 in. a minute, there is plenty of time to stand back. If one man is doing the job, it is advisable not to charge and fire more than 25 shots at a time; otherwise he may lose sight of a possible misfire.

EFFECT OF THE EXPLOSION.

There will not be a big report, as some expect; neither will there be a displacement, to any extent, of the top soil. Where a number of holes are fired together, the effect for a fraction of a second resembles porridge on the boil.

The vibration of the shot will be felt from 10 to 15 ft. away, and this is practically the distance shattering of the subsoil extends. If one could take a section of the ground, the fractures could be easily seen.

THE COST.

The following table will give some idea of the cost of subsoiling with explosives. I do not include labour, as this will depend on the rate paid and also on the strength of the ground. Where conditions are easy, a hole a minute should be done; but where the hard-pan is tough and the sub-soil very compact, it may take 5 minutes. Preparing the charges and tamping the holes will take nearly 4 minutes per hole.

DONT'S.

There are several " Dont's " to be observed, and it may be well to note a few :—

1. Don't smoke on the job.
2. Don't tamp with a metal tamper; use a wooden one—a broom-handle is excellent.
3. Don't tamp hard at first.
4. Don't, in the event of a misfire, untamp the hole, but put down another hole about 1 ft. away.
5. Don't forget that you are using explosives, and get careless after firing a few shots.
6. Don't clinch the cap on to the fuse with the teeth.

I would advise intending subsoilers, if they have not had previous experience, to attend one of the demonstrations that are given from time to time by the department, under the auspices of the various branches of the Agricultural Bureau, for, although the method is not difficult, ocular demonstration is always better than printed instructions.

Dry weather is the best time. Results are better then. When the soil is wet, the subsoil is liable to pug, and, instead of shattering downwards and outwards, the explosive is liable to have an upward effect.

ADVANTAGES OF SUBSOILING.

Some of the great advantages of subsoiling land are:—

1. Conservation of the rainfall in the subsoil.
2. The drainage will be far more satisfactory.
3. It is possible to get on the land quicker after rain.
4. Air and atmospheric heat can get to the subsoil and sweeten it up.
5. Roots of all crops are encouraged to go down, instead of spreading unnecessarily near the surface.

TABLE SHOWING COST OF SUBSOILING WITH EXPLOSIVES.

Distance of holes apart.	Charge	Number of Holes per acre.	Number of Lb. per acre.	Number of Feet of Fuse per acre in 3 ft. holes.	Number of Detonators per acre.	Total cost per acre.
Feet.	Plug.					£. s. d.
10	½	435	21¾	1,305	435	2 12 9
10	1	435	43½	1,305	435	3 14 6
12	½	302	15	906	302	1 16 6
12	1	302	30	906	302	2 11 6
15	½	194	10	582	194	1 3 10
15	1	194	20	582	194	1 13 11
18	½	128	6¼	384	128	0 15 4
18	1	128	12½	384	128	1 0 7
20	½	109	5	327	109	0 12 9
20	1	109	10¼	327	109	0 18 0

Manuring Para Rubber.

For several years past certain plots of Hevea at the Experiment Station at Gangaroowa have been manured with definite mixtures—that is to say mixtures containing an excess of nitrogen potash, etc., and now that the trees have arrived at a tappable age they will be tapped shortly, one system being followed in order to determine whether manuring influences the yield of latex. That is, of course, apart from any extra growth of the tree. It might be taken as a general rule that the bigger the tree the more rubber one can take out of it. It is not universally true, but it may be taken as a general principle. The idea of these manuring experiments is to find out whether any given manure will produce an increased flow of latex, independent of the size of the tree, without, necessarily, showing a better growth.—*Commerce.*

RUBBER.

Rubber Planting in the British Empire.

At the Northern Polytechnic, London, N., on Thursday evening, September 25th, a lecture was given by Mr. Cyril Baxendale on the "History of Rubber Plantations in the British Empire." Mr. Noel Trotter, Chairman of the Rubber Growers' Association, presided. Mr. N. Trotter is also Chairman of the Special Advisory Committee of the School of Rubber, which has been established at this Polytechnic, Mr. Fredk. Kaye, A. R. C. S., being the lecturer.

Mr. Baxendale, in the course of his lecture, said: I was planting rubber several years before the first ton of plantation was shipped to Europe, and, perhaps, now I realise even more clearly than a few years ago, how far from finality our knowledge is, not only as regards the habits and needs of the tree itself, but the treatment of its produce. Without any desire to boast about our little triumphs in the field, I am inclined to think that our knowledge of the agricultural side, deficient as it is, has advanced more rapidly than has the knowledge of its subsequent treatment. If any evidence of this is needed, you have only to take the market quotation to see that the clean, cultivated produce sells at from 30 per cent. to 40 per cent. less than the produce of the same tree grown in its wild state, although the latter suffers 20 per cent. loss on washing. Thus we find that pound for pound cultivated rubber sells at less than half the price of fine hard from Brazil, in spite of the fact that distinguished chemists, who have subjected both kinds to exhaustive experiment, have still found that, on the whole, the laboratory tests are distinctly in favour of plantation smoked sheet. In the meanwhile the value of research work is immense, and it is difficult to imagine any industry where the commercial possibilities are so attractive as those that await the keen student of this subject. A great deal has been done on both sides of the Atlantic, but during my visit to America last autumn, I formed the opinion that the American manufacturer, thanks largely to the keenness and ability of his laboratory chemist, is advancing more rapidly in the knowledge of plantation rubber, and has put that knowledge to more general uses than our friends over here. I trust I am mistaken, but if the reproach is justified, the formation of this Rubber School will help to remove it.

The first successful attempt to introduce *Hevea Brasiliensis* into British territory was made by Mr. W. A. Wickham in 1876. This, the most important and useful piece of smuggling ever recorded, was inspired by the late Lord Salisbury, and its value seems to have been appreciated by Sir Joseph Hooker and his staff at Kew Gardens, for we are told that they took delivery of the cases in the middle of the night, and no one returned to bed until those 70,000 seeds had been safely planted. Sir Joseph's efforts were rewarded by 2,800 germinations, and in the same year the plants were shipped to the Peradeniya Gardens of Ceylon, as a depôt for the plants, from which the cultivation was ultimately spread all over the British Colonies wherein the plants could thrive, and to some wherein it could not. In 1867 a case of 22 plants reached Singapore, and were successfully planted by Mr. Murton, then curator of the newly-founded Botanic Gardens there. The same year the first Hevea trees arrived in the Malay States. Two cases were sent to the late Sir Hugh Low (British Resident of Perak) and I am glad to say he lived long enough to see something of the success of the industry that he helped to found. Seeing that civilisation has become dependent on cultivated produce, it may seem strange that the profitable cultivation of rubber should have been for years open to doubt. The only explanation I can offer for this is that the duty of tapping Hevea was relegated to Sakeis (Malayan aboriginals), who hacked them with choppers in the same old way that they collected Rambong (*Ficus elastica*) and other wild rubber, while the results they achieved were insufficient to tempt any capitalist to risk a penny in the business. It is to our scientist friends that we owe the primary knowledge of how these trees might be made profitable. Nothing was achieved prior to Mr. Ridley's appointment as Director of Botanic Gardens at Singapore in 1888, and it was not until 1891 that the first sample of plantation rubber was sent to London from Malaya, and was favourably reported upon by experts. During the nineties, several gentlemen in Ceylon, and Mr. Derry and Mr. Leonard Wray in Malaya, continued the experiments. The first actual sale of plantation rubber recorded was in 1899, at 3s. 10d. per lb. This was from trees grown from Wickham's seed, then 22 years old. There were a few of these trees privately owned, scattered about as interesting botanical specimens on various estates in Ceylon and Malaya, but the first planting on a commercial scale dates from 1895—only 18 years ago. Rumours of remarkable results from the first-planted trees of Ceylon and Malaya reached Europe, and, in consequence, as the years rolled on it became increasingly easier to raise money for rubber plantation, right up to the boom of 1910, when, after a wild, mad, and never to be sufficiently deplored season, the pendulum started to swing the other way, and has kept on doing so.

The extension of the area under Hevea in Malaya, which in 1905 amounted to about 38,000 acres, increased at an average rate from that year of about 70,000 acres per annum. The total area under Hevea in British Malaya, *i.e.*, Straits and F. M. S., now amounts to 600,000 acres. The progress in Ceylon, where the tea industry was more prosperous than the coffee and sugar plantations on which the British planters of Malaya mostly depended, has naturally been less rapid. Nevertheless, there is a considerable area under rubber in the island, while the plantations in the Travancore district of India, Burmah, Northern Australia, New Guinea, Africa, the West Indies, the South Sea Islands, Java, Sumatra, Hawaii, etc., brings the total to upwards of 1,000,000 acres. The recent decline in the price of rubber has curtailed extensive programmes, and we may also assume that, if the value of plantation rubber falls to anything below 2*s.* a pound, the production will be curtailed. although the older estates in favoured localities may be able to produce with a moderate profit at 1*s.* 6*d.* a pound, and some at even a lower figure.—*The India Rubber Journal.*

MALAY RUBBER EXPORTS.

The figures of the exports of plantation rubber from the Federated Malay States for the month of September, just cabled over, show an increase on those for the corresponding month of last year of 1,511,300 lbs. The month's total was 4,480,000 lbs. which brings the aggregate for the nine months from 1st January up to 37,254,700 lbs. as compared with 24,701,800 lbs. for the corresponding period 1910 and 13,260,300 lbs. in 1911. The figures do not include the output of Ceylon, Java and other plantation rubber producing countries, but they indicate the rapid growth and importance of the industry and form an argument for the desirability of the establishment of a comprehensive plan for marketing the commodity, such as the Central Selling Agency which has been advocated.—*Commerce.*

TEA.

The total quantity of tea exported in 1912 was 197,559,867 lbs., valued at £5,154,588., against 195,040,400 lbs., valued at £5,161,300 (in 1911. A decrease of over 11,000,000 lbs. in black tea was counterbalanced by an increase of 12,000,000 lbs. in green and brick tea. The decrease in black tea is chiefly due to the serious decline of direct exports to the United Kingdom, Hong-Kong, and the United States, caused by the large supplies from India, Java and Ceylon. The export of black tea from Java is already over 70 per cent. of the export from China, and is steadily increasing. Owing to the relaxation of the Pure Food Act, the export of green tea to the United States was more than doubled. The Mediterranean ports show the growing popularity of tea on the Continent. There was a decline of shipments to the European Ports of Russia, which may be attributed to the congestion of the Batoum market caused by the excessive imports of 1911. Although the figures for 1912 compare not unfavourably with those for the previous year, there is a general feeling that the China tea trade is on the wane. Various causes are assigned to the falling-off. There is a tendency amongst cultivators to aim at quantity rather than quality, and much reckless competition is indulged in by the middle-men for the raw leaf, resulting in unduly inflated prices.

In spite of predictions to the contrary there was a very large crop of both black and green teas in the Hankow and Kiukiang districts at the beginning of the year, though most teas were interfered with by the spring drought. Far more tea was produced, however, than was wanted, with the result that the markets in many parts of the world were rapidly overstocked. Chinese teas have failed to maintain their popularity in the United Kingdom, and Russia is taking more and more to the Indian Teas. —(*Diplomatic and Consular Reports.*

The Coffee Crop.

An estimate of the Brazilian coffee crop sent from Rio de Janeiro by cable to our Paris contemporary, "L' Information." and based upon the statistics forwarded to the Ministry of Agriculture by the Governments of Sao Paulo, Rio de Janeiro, Bahia, Victoria, Mines and other States, gives the figure of the 1914-15 crop, which will be exported from 1st July next, at 12,300,000 bags of 60 kilos each. This is a small crop, and, supposing the estimate made for other producing countries be accurate, the Brazilian output would be about three-fourths of that of the entire world, which is stated at 16,300,000 bags. The world's consumption for 1912-13 was 17,000,000 bags and the annual increase should bring this up to about 17,300,000 bags, or about 1,000,000 bags more than the output, which would mean a diminution of the same amount in the visible stocks. The report naturally gives great satisfaction to the Brazilian producers, who had been apprehensive as to the output in Java.—*Commerce.*

From all accounts it is evident that there is a deal of cut-throat competition going on in Southern India in connection with the recruiting of Tamil labourers of the agricultural classes for service in Ceylon, Malaya, Burma, etc. Naturally, therefore, high rates are being offered, and inducements by false representations held out in some cases. The Tamil coolies have now come to learn their value and probably more and more difficulty will be experienced by recruiters in the future. The Labour Question appears well nigh insoluble. It is the burning question of the day, yet the solution of the problem gets no forwarder.—*Indian Planters' Gazette and Sporting News.*

CORRESPONDENCE.

Tea.

THE EDITOR,
The Planters' Chronicle,
Bangalore.

Dear Sir,—I should be glad to hear if Tea Planters in general find an almost constant "loss" in weight in London returns. For years past I have found it so, and, though every care is taken in packing the loss still continues. Sometimes the monotony is varied by a shipment weighing out correctly; and, *very occasionally*, a small gain is noted, but the loss outweighs all else.

In packing, 4 oz. tea are always allowed over the weight marked, and the chests are kept 4 oz. under the half pound, so that the gross weight on despatching, runs to the half pound. This method was recommended some time ago by a London expert, but the losses continued.

Doubtless the moisture absorbed by the chests makes a difference in weight, but since the chest is weighed in both "Gross" and "Tare," there should be no loss in weight of tea.

I may mention that Imperial, Cotton-wood and Venesta chests have all been used at different times.

If any one can suggest an improvement in packing methods, it would greatly oblige

Yours faithfully,
"ONE INTERESTED."

November 5th, 1913.

Mercara, 5th November, 1913.

Non Service of Warrants.

The EDITOR,
The Planters' Chronicle.
Bangalore.

Dear Sir,—At the recent meeting of the Coorg Planters' Association in the report read by one of the Delegates to the U. P. A. S I. there was under heading "Non Service of Warrants" a remark made regarding non-extradition from Travancore giving the reason for the reluctance of the Madras Government to enforce extradition rights on the Native State of Travancore that it was "a tender point with them." (and with the Travancore Government also I presume)!

This is all very well, but I would like to point out that there was no such anxious reluctance on the part of the British Government when dealing with the Native State of Mysore on the matter of extradition and for the life of me, I cannot see why the Native State of Travancore should, alone, be allowed the privilege (if privilege it be) of giving sanctuary to cheats and misappropriators of other people's money.

My maistry gets an advance from me to collect coolies for my estate. He collects coolies, but learning that by walking across the border into Travancore he can, not only misappropriate my money with impunity, but is welcomed with open arms and more money is pressed on him, and he has the impudence—knowing himself safe—to write and tell me where he is, what he is doing with my money! and even asks for more!!

The British Government does not like to hurt the feelings of the Travancore Government by insisting on the apprehension—under a warrant of a British Magistrate—and punishment of a man like this, while the Travancore

Government (by inference) takes it as a privilege being allowed to give this impudent fellow sanctuary.

The Hon'ble Mr. Barber please take note of this.

I am,
Yours faithfully,
G. K. MARTIN.

The Labour Commission.

THE EDITOR,
The Planters' Chronicle,
Bangalore.

Dear Sir,—I wonder how many Associations will be in favour of having a Labour Commission run on the lines given in Mr. Nicolls' letter on the 21st ultimo, which informs us that the Labour Commission will do "No direct recruiting" but will only advise planters "as to the prospects of recruiting in the various districts," which means that maistries will recruit as hitherto and competition will continue.

Is this the sort of "combination" which has been advocated as one of the advantages of having a Labour Commission? I was always under the impression that the first aim and object of the Ceylon Commission was to recruit coolies and that they do so "direct," and that the South Indian Labour Commission was to "have the experience of the Ceylon Labour Commission as a guide" but it seems that this "experience" in this line is not to be followed—and only in the matter of registering, feeding, and medically examining coolies, etc. It appears that maistries are to recruit as hitherto, and then take their coolies well out of their way to their estates to one of the Labour Commission's Depots to have them registered, fed and protected. What an advantage over the present system!

It strikes me that the native staff would have to be considerably larger than is estimated, if it is going not only to supervise all "the maistries sent to recruit" but also to "furnish reports to the estates from which they have come." It is not as if this work could be spread over the whole year or even half of it.

It seems Mr. C. E. Murray-Aynsley was under the impression that the Labour Commission intended to recruit "direct" when he pointed out that estates which had their labour established would be paying for those which still required labour.

After carefully considering all the "advantages," so far offered by the Labour Commission, the following seem to be the only three which may be profitable or of use *viz*:—

(1) being able to have enquiries made as to the status of maistries; but as this would probably be done by natives with no particular facilities to help them, no training, no check and not over much intelligence, it is questionable if the information would be very reliable.

(2) the distribution of pamphlets; though I doubt if this would do much good unless the distributor was prepared to make advances on the spot and take the recruits away with him.

(3) the investigation of new recruiting areas.

Is this worth paying at least a rupee an acre for?

The main question is the supply of labour as pointed out originally by the Labour Committee *viz*., the limiting of the advances of our competitors, seems to now be ignored.

Yours faithfully,
N. I. K.

The Planters' Chronicle.

RECOGNISED AS THE OFFICIAL ORGAN OF THE U. P. A. S. I., INCORPORATED.

(Secretary's Registered Telegraphic Address "Planting," Bangalore.)

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THE U. P. A. S. I.

(INCORPORATED.)

Contents.

We publish the Proceedings of the Bababudin Planters' Association. We note with approval the advice given by the President as to being provided with Sprayers and Spraying Mixture so as to be ready to attack Green Bug, should it put in an appearance—"To be forewarned is to be forearmed." Apparently as so many different sorts of sprayers are, or will be in use, it would be interesting to compare results of efficiency in working and cost, especially from those who may have two or more sorts at work. It will be noted that the Bababudin Planters' Association, though in accord with the principle of the establishment of a Labour Commission, suggest a sliding scale of subscription. The coming Extraordinary General Meeting should prove interesting, and have a permanent effect on the Planting Community—an effect, we believe, good for all time.

The extraordinary fluctuations of the Rubber market of recent months, has given cause for anxiety and thought to those interested in its cultivation, both as investors and proprietors, but the article we reproduce from *Capital* appears so sensibly reassuring, with its forecast of estimate, and is not too optimistic in tone, that it should be carefully read. The analogy drawn from the coal gamble in Calcutta is very appropriate. The aim of all must be reduction of cost of production, selection of seed to secure the greatest yield of latex, and scientific advice. Southern India with its comparatively cheap labour should come to the front. We recommend a perusal of the tables.

Our correspondence columns contain two letters on the Labour Commission, and it is by such expressions of opinion, that the Labour Committee will be able to present a scheme which will be found acceptable to the Planting Community, or capable of being so amended as to secure the support of the majority—if not of all.

We welcome Mr. Hindley's letter on the use of Explosives in Agriculture, and we have by no means forgotten that he had made an experiment in growing tea and only waited for the proper time to arrive to ask him if he had seen those beneficent results which we fully anticipated.

DISTRICT PLANTERS' ASSOCIATIONS.

Bababudin Planters' Association.

The Second Annual General Meeting of the Association was held at the Siddabile Bungalow, Santaveri, on November 5th, 1913.

PRESENT:—Messrs. A. B. Boyd, (President); T. S. Conner; A. C. W. Denne; S. H. Dennis; F. Hugonin; W. St. C. Johnson; H. Kerr; O. Watson; and N. G. B. Kirwan, (Hon. Secy.)

The Minutes of the last meeting were read and confirmed.

(1.) *President's Address.*—This Meeting should have been held at an earlier date, but Mr. Kirwan tells me he put off calling it, to give men who were at home a chance to attend it. As one of the men who were at home, I thank him for having done so. Having just returned from home, after an absence of six months, I must ask you to forgive me not being able to say much about what your Association has done during the past year, but I feel sure our Honorary Secretary, Mr. Kirwan, will tell us all there is to know.

Two matters of great importance have cropped up lately, *viz.*, the proposed Labour Commission and the rise in coolies' pay. As regards the Labour Commission, if the rest of the planters of S. India agree to have it, I think we certainly ought to join. At present no one seems to know much about what its duties are to be, so we will have to wait till after the Extraordinary General Meeting of the U. P. A. S. I., which I hear is to be called shortly, before we know what's what.

Now is the time to send in any suggestions we may have to make.

Coolies' Pay.—If it is true that Coorg has already given 5 annas and 3 annas, and that North and South Mysore are about to follow suit, there is nothing left for us but to give it also.

Bug.—We ought to be very thankful that so far there has been no outbreak of Green Bug in our District. Report says that the Bug is well known in several places in the Low Country. So it is the duty of every planter to be prepared for it, and to lay in a supply of Sprayers and Spraying mixture at once, if not already done so. Most of our pests have come up from the Low Country, so it is from there that we have chiefly to guard against it.

I hope that Government will very soon bring in a stringent Pest Act.

Roads.—Our agitation of the Road question has received attention from the Government, and resulted in a very liberal allowance for the Santaveri-Chickmaglur Road. Certain Members of the Association have undertaken the work to assist the Public Works Department, but it is much to be regretted that the work is so very much behindhand, and I hope that this will soon be rectified.

We are glad to have Mr. Poppanna as Executive Engineer. He has already shown great energy in getting round the District in the Monsoon.

Santaveri Sunday Dispensary.—The correspondence on this question resulted in an Ayurvedic Dispensary being authorised from July, 1913, for a trial. But up to date nothing has been seen of the Dispensary.

Railway Rate.—The reduction on Manure Freights from Dharwar was asked for and granted by the M. and S. M. Railway.

Bababudin Hill Road Toll Gate.—The Committee appointed for this matter in conjunction with the North Mysore Native Planters' Association has put forward a scheme for the up-keep of this road, at a much reduced figure, and it is hoped that Government will agree to their proposals and not impose a Toll Gate. H. H. the Maharajah visited the District last hot weather. His visit was greatly appreciated by both Europeans and Natives, and I hope it will not be long before we see him in our midst again.

As to-day's agenda is a very long one, I think I have wasted more than enough of your time.

But, before sitting down I shou'd like to thank our Honorary Secretary, Mr. Kirwan, for all he has done for us. No one could have done more, and very few as much, so I think we all owe him a very hearty vote of thanks.

(2.) *Honorary Secretary's Report. Accounts.*—The accounts for the past year are laid before you.

The balance to the credit of the Association at the close of the year is Rs. 1,461-11-11. Of this sum sum 150 is held on behalf of the Sanderson Ward Store Building Fund, and 780 is due to the Scientific Assistant Fund to complete the 2nd years' subscription, leaving a working balance of Rs.531-11-11.

The acreage for the past year was 5,721 acres, an increase of 332. One Estate which promised to join us, failed to do so and thus entailed our paying a slightly larger subscription to the U P. A. than we should have done. We had guaranteed our subscription on 6,000 acres, against the 5,721 that actually paid.

Subscriptions for the current year have been paid by all estates except three. Also subscriptions to the S. I. P. B. F.

Budget.—Subscriptions for the Current year will amount to Rs.2,870 8-0 which added to the balance of Rs 531-11-11 gives a total of Rs. 3,402-3-11.

EXPENDITURE.

	RS.	A.	P.
Subscription to the U. P. A. at 2 as. per acre	715	2	0
Postages, etc.	15	0	0
C. of P. A. Postages	10	0	0
Address to the Viceroy	75	0	0
3rd. year subscription to the Assistant Sc. O.	1,800	0	0
Total...	2,615	2	0

leaving a balance of Rs 787-1-11.

While thanking all members for their assistance during the past year, I have much pleasure in tendering my resignation.

Mr. Johnson was asked to audit the accounts for the past year.

(3.) *Minutes of the Council Meeting.*—The minutes of the last meeting of the Council were read. Attention was drawn to the new arrangements made with Mr. Frattini, *viz.*, that he should look to the members of the Council in each District to help him in securing plots for experiments, and to safeguard their continuity. Also, that experimenters will be expected to bear the costs of their experiments, and make their own arrangements for getting up materials.

The Scientific Assistant's programme for the coming year was discussed. It was pointed out by the Honorary Secretary that much adverse criticism of the Scientific Assistant's work is heard, but that the work he is now engaged upon is not such as immediate results can be shown. Members were asked to suggest some other line of work, if they were not satisfied with things as they are at present.

After a general discussion members expressed their approval of the present programme.

(4.) *Introduction of Tea into Mysore.*—Read letter from Mr. C. Srinivasa Rao on this subject. It was also pointed out that the Economic Conference had sanctioned an expenditure of Rs. 500 for the purchase of Tea Seed.

(5.) *Green Bug and Sprayers.*—The Sprayer sent on approval by Messrs. Smith, Stanistreet and Co. of Calcutta was tried, and 10 were ordered by members present. It was further mentioned that the Mysore Planters' Supply Company had been put into communication with the above Firm, as Messrs. Smith, Stanistreet and Co. suggested stocks being carried locally.

Report No. 3. of the Scientific Assistant contains all directions for making the spraying mixture.

The Honorary Secretary was asked to obtain information as to the cost of spraying per acre.

(6.) *Proposed Mysore Labour Law.*—Mr. Dennis reported the result of the interview with the Dewan on this subject.

(7.) *Labour Rates*—After some discussion on the rise in rates, necessitated by the action of Coorg in raising their rates, the following resolutions were passed.

Proposed by Mr. Kirwan, and seconded by Mr. Boyd.

That we keep to our present rates as long as we can, but, if others raise their rates, we fall into line. Carried.

Proposed by Mr. Hugonin and seconded by Mr. Denne.

That members agree not to raise rates until the matter has been further discussed at a meeting of the Association. Carried.

(8.) *Bababudin Hill Road Toll-Cate.*—Mr. Hugonin reported what the Committee had done in the matter.

(9.) *Viceroy's Visit to Mysore.*—The payment of the Association's share of the Address and Casket was sanctioned.

(10). *Removal of Timber from Coffee Estates.*—Read Government order No. R. 2046-54/ft. 25-12-2 of September 1st 1913, to the effect that, if the Forest Department does not affix its seal to timber for which a license has been granted within six months, the timber may be moved without further delay.

(11.) *Delegates' Report, U. P. A. S. I.*—The Delegates' Report was read by Mr. Dennis.

MR. CHAIRMAN AND GENTLEMEN,

Before reading our report I should like to say, I am sorry my co-Delegate, Mr. Lovett, is also not present to-day, illness being the cause of his absence.

What I have to say is very brief, and is merely a resumé of matters which took place at the Conference in August and are of particular interest to us.

Your Delegates were not instructed to bring up any special subject, but we hoped the vexed question of Labour would be solved.

Labour.—A proposal was brought forward by the Hon'ble Mr. Barber, one of the Labour Committee appointed last year, that we should have a *Labour Commission.* This proposition was unanimously supported, and a Committee was appointed, on which our Honorary Secretary (Mr. Kirwan) served, to draw up a scheme. You have all, doubtless, received the printed report of the Committee.

Pest Act.—A Resolution was passed asking Government to introduce a Pest Act, and I see the Imperial Council at Simla have an "Insect Pests Bill" before them at present. A Deputation from the combined Associations of Mysore waited on the Dewan of Mysore, at which we brought forward this subject together with others, and he was sympathetic. Dr. Coleman, Director of Agriculture to the Government of Mysore, is also going to take drastic measures against Green Bug in the abandoned and neglected native Estates in the infected area, which will be one of its greatest nurseries.

Sprayers.—I need not say anything on this subject, as you are already in possession of our Hon. Secretary's report.

Scientific Officer.—We agreed to continue your subscription to this fund for another period of 5 years, and so did all other Associations, with the exception of one. It was generally admitted that Mr. Anstead's services to the Planting Community were most valuable.

We supported the suggestion of a Mycologist being added to the Scientific Staff, as so many of the diseases of Coffee, Tea, and Rubber are of a fungoid description.

European Defence Association and School of Tropical Medicine were also on the Agenda, and it was resolved that both were worthy of support by members.

Hybridization.—The progress made at the Nilgiri experimental plot was good, we were told, but no great advancement could be made until the plants flower and produce seed.

Planters' Benevolent Fund,—The report of this fund from 1909 to December 31st, 1912 was given to Delegates—it was in a floursing condition, having a substantial sum invested, *Arsikere-Mangalore Railway.*—The construction of this line, we were given to understand, was now probable, as it only awaited the sanction of the Railway Board.

Agricultural Board's Visit—We were informed at the meeting that the Imperial Board of Agriculture will visit the Madras Presidency this cold weather, and some members of the U. P. A. S. I. hope to have the pleasure of showing them some Estates in the vicinity of Coimbatore.

A vote of thanks to Messrs. Dennis and Lovett for their representing the Association in Bangalore was carried.

(12). *Proposed Labour Commission.*—Mr. Kirwan shortly explained the duties of the proposed Commission, as far as he had been able to ascertain it in Bangalore.

A general discussion on the subject followed, and the views of the meeting were incorporated in the following resolution :

" Proposed by Mr. Boyd and seconded by Mr. Johnson :

" That this Association is entirely in accord with the formation of a Labour Commission, with a view to future co-operation in Labour matters in Southern India.

" As coffee cultivation only requires about ½ a cooly per acre, as against 1½—2 employed by Tea & Rubber, Coffee interests should be permitted to join the Commission at 8 as. per acre after paying the initial subscription up to Rs.2 per acre."

Voting—6 for, *nil* against, 3 members did not vote.

1,710 acres were enrolled for the Labour Commission. Messrs. Boyd and Kirwan were elected to represent the Association at the U. P. A. special meeting."

13. *Election of Office Bearers.*—

		President,	Vice-President.	Secretary.
Denne	...	1	4	0
Boyd	...	8	0	0
Hugonin	...	0	1	0
Johnson	...	0	3	0
Dennis	...	0	1	1
Kirwan	...	0	0	8

Result.—Mr. Boyd, President, Mr. Denne, Vice-President, Mr. Kirwan, Honorary Secretary.

(14.) *Election of Members of the C. of P. A's.*—Last year's members were re-elected, *viz.* Messrs. Hugonin, Dennis and Kirwan. With a vote of thanks to Mr. Boyd for his hospitality throughout the year the meeting closed.

(Signed) A. B BOYD,

Chairman.

") N. G. B. KIRWAN,

Honorary Secretary.

RUBBER.

Rubber Investments.

Much outcry has of late been heard regarding the so-called slump in plantation rubber and the amounts which have been lost by share-holders in Mid-Eastern companies. Home papers have devoted heavy lead to the scare headline "What's wrong with rubber!" and many have proved themselves amenable to the influence of *ursine* operators in publishing exaggerated extravaganza on the subject, having little or no foundation in fact. Some of the latter have found their way into the Indian Press *via* the scissors and paste route, and so it may not be out of place to devote a little attention to the actual state of affairs from an investment standpoint at the present time.

Human nature is the same all the world over and, in the minor cataclysms of financial life, history has a remarkable way of repeating itself. Wiseacres, after the event, can tell us that the top of the coal boom in 1907, when people were falling over each other in the get rich-quick struggle to purchase shares, was the time when the few judicious operators were busily unloading their scrip on an all too gullible public. The inevitable happened, and the prices of good shares under the lash of mere temporary adversity fell too far below their intrinsic merits. Then was the time to buy, and those who realized their opportunity have benefited handsomely now that the industry has returned to normal conditions. If speculative operators and investors would realize the truth of the homilies: "'Buy when every one else wants to sell, and sell when all others desire to buy" coupled with "Never expect to get in at the bottom or out at the top," we should have less sore heads and empty purses in Calcutta (not to say Bombay!) to-day. Yet, despite the foregoing example of our last great boom, precisely the identical thing has happened again in rubber, and will doubtless occur again in heaven knows what to-morrow. An acre of rubber costs on the average, not more than say £50 to bring into bearing. Allowing £20 as a generous provision for interest during unproductive development years, we may take the inclusive figure at £70, and for this article, which the world can produce in literally any quantity required, the public were greedily purchasing up to even as high a figure as £1,000, being the market capitalization per acre of some of the leading stocks at the height of the boom. It is easy to be wise after the event, but really it does seem a waste of sympathy to throw compassion to such unthinking and unreasonable dabblers in financial spoliation.

The price of rubber has now come down to a reasonable level relative to cost of production and is still, and will as far as can be foreseen, continue, in a position to pay quite a handsome return on the money invested in reasonably capitalized estates, provided the same are favourably situated and properly managed. Putting development expenses, including interest on capital during the unproductive period, at £70, cost of production at 1s. per lb., sale price at 2s. a pound and a yield of 300 lbs. only per acre, a return of £15 a year profit on a capital outlay of £70 may be looked for, which is by no means an unhandsome result. One of two of the foregoing points, however, cannot be passed over without comment. "Can plantation rubber be produced at 1s. per lb. all in?" and "Will the price remain as high as 2s. per lb?" These two questions sum up the whole of the rubber question of to-day. Rubber can be produced at an inclusive cost of 1s. a pound, for the very simple reason that it *is* being produced at that rate to-day. Very few estates have got their expenses down to this low figure admittedly, but that some have done so proves that it is to be done, and what is more, will have to be done by those concerns which mean to be first rankers and produce the best results for their proprietors. When estates first come into bearing expenses of production must necessarily be high, but these should gradually be reduced until the ultimate goal of shilling rubber is reached. It is not every estate that is going to get anywhere near this figure, however; some of them will never get much below the two shilling mark, unless they go about it in a very different way to the methods of to-day. This question of production costs, present and prospective, should be the most important point in the selection of rubber investments at the present time. Availability and cost of labour, transport facilities, healthiness or otherwise of estate, taxation, rent, rate of tree growth, competency and cost of management, agency charges and many minor points of expenditure have all to be taken into consideration in dealing with the matter, and will repay the study of the cautious investor, before he purchases shares at even to-day's depreciated quotations. These are matters which each investor must look into himself, and the only point of general interest, which it may perhaps be well to add, is a note of self-congratulation that our Southern India and Lower Burma plantations give promise of being quite in the first rank as cheap producers, and of being likely to hold their own, whatever fate may hold in store for concerns situated in countries where your rubber will cost you more.

The second and equally crucial matter which demands attention from those interested in rubber at the present time is the question of the probable future price of the product, which has recently experienced such a severe fall in selling value. A well-known firm of rubber share brokers in London have just compiled the following estimate of the world's actual and estimated future production of rubber:—

I.—*Actual.*

WORLD'S PRODUCTION IN TONS.

	Plantation.	Brazil.	Rest.	Total.	Consumption Tons.
1905 ...	145	34,000	26,800	61,000	61,000
1906 ...	510	36,000	29.500	66,000	66.000
1907 ...	1,000	38.000	30,000	69,000	69.000
1908 ...	1,800	39,000	24,200	65,000	65,000
1909 ...	3.600	42,000	23,400	69,000	68,500
1910 ...	8,200	40,500	21,300	70.000	66,000
1911 ...	14,100	39,500	22.400	76.000	73,000
1912 ...	28,500	40,500	30,000	99,000	98,000
1913 ...	42,000	41,000	32,000	115,000	112,000
		II.—*Estimated.*			
1914 ...	64,000	40,000	20,000	124,000	126,000
1915 ...	94,000	38,000	10,000	142,000	142,000
1916 ...	121,000	35,000	5,000	161,000	159,000
1917 ...	147,000	32,000	2,500	181.500	179,000
1918 ...	166,000	30,000	nil	196,000	197,000
1919 ...	183,000	30.000	nil	213,000	216,700
1920 ...	198,000	30,000	nil	228,000	238,370
1921 ...	209,000	30,000	nil	239,000	262,200

The figures given up to 1912 are actuals, and those for 1913 will necessarily be very near the mark. From and after 1914 the details are based on expected yields per acre. They go on to say:—

"One of the most striking results of the slump in rubber prices has been the effect upon the market for inferior grades of wild rubber (Congos, etc.), which have already become unsaleable, except at a severe loss. All competent observers agree that these grades are likely to drop out with startling suddenness, but to be on the safe side we have allowed for diminution of only 12,000 tons during 1914, and have assumed that for a year or two afterwards substantial, though diminishing, quantities of inferior wild rubber will still somehow be brought to market. Another direction in which we have deliberately over-estimated supplies is in the figures for Brazil. It must not be forgotten that of the 40,000 tons at present coming from Brazil, considerably less than one half is fine hard Para. The remainder consists of inferior grades which are likely to go the way of Congos, etc., but in our estimate we have allowed for only a gradual shrinkage, and have left Brazil appearing as a producer of 30,000 tons per annum even after 1917.

"Turning to the great question of future consumption, it will be seen from our table of actual results that for the past nine years there has been an average annual increase of about 10 per cent. The figures for 1911, 1912 and 1913 show an average increase of 19½ per cent. per annum. We have assumed an annual progressive increase of 12½ per cent. for the four years 1914-1917, but have then dropped the rate of increase to 10 per cent. This is probably a substantial under-estimate when the allowance is made for the stimulating effect of low prices on demand and for the rapid expansion of the motor industry. The lull in American demand, traceable largely to special causes, is merely a passing phase.

"Summing up the situation, it is pretty clear, from the statistics, that no real over-production exists at the present time, nor is there any reason to expect it in the near future. If the price of plantation rubber remains for a time in the neighbourhood of 2*s*., the world's output, which we have estimated for 1914 (124,000 tons), is likely to be so sharply reduced through the further falling off of inferior wild grades and the natural restriction of plantation supplies from those estates which cannot produce profitably under the conditions named, that an actual shortage may easily be experienced before the end of the twelve months. If, on the other hand, the price shows a moderate recovery, our estimates for 1914 and the next year or two are likely to be very near the mark, and (as will be seen by referring to the figures) this will mean that the margin between supply and demand may sway a little one way or the other, but up to 1819 there would be a position which would secure thoroughly profitable working for the plantation industry. This is on the assumption that Brazil will still be supplying 30,000 tons per annum. From 1919 onwards a heavy and increasing shortage is indicated even if Brazil is still good for the same quantity. Any important reduction from the quarter would bring about a shortage at an earlier date. Of course, conditions may be expected to adjust themselves as the years go on, and the working of economic laws will lead to increased supplies, if required, by the extension of planting, etc. We do not suggest that in 1921, 23,000 tons more rubber can be consumed than produced. But we do suggest that by that date a very much larger amount of rubber will have to be forthcoming from somewhere than could be supplied by all the plantations which are just now striking such fear into the heart of the pessimist, plus 30,000 tons from Brazil."

The foregoing appears to be quite a logical rendering of the future prospects of the industry and should go far to reasure both existing investors in reasonably capitalized concerns, and those who take advantage of the present slump in prices to acquire an interest in rubber, that they are participating in an industry which is not likely to become less remunerative than at present, except perhaps quite temporarily at any time, and which affords an excellent opportunity for the profitable investment of capital.—*Capital.*

CORRESPONDENCE.

Pundalur P. O., Nilgiris.
13th November, 1913.

The Labour Commission.

THE EDITOR,
Planters' Chronicle,
Bangalore.

Sir,—It is practically admitted that there are not two opinions as to the desirability of some scheme such as was outlined by the Committee appointed at the last meeting of the U. P. A. S. I. to deal with this matter, and the principal objection to it, underlying all others, is the one of cost. As matters stand we have to put down Rs. 2 per acre or stand out. This is a high premium for a very partial insurance, and I think it a pity that the Committee was asked to go into the method of raising the money at all, during the limited time that must have been available for drawing up a scheme of the kind. Had a draft estimate of the probable cost been made, and the method of raising the necessary amount left for consideration and discussion by District Associations, the scheme would then still have been in the "melting pot," and whether the money was to be raised by an acreage assessment, a poll tax, or a percentage on advances, or in any other way could have been decided there, and men with small advances, or local labour would have had an opportunity of placing their views before these various meetings from their own particular standpoint.

Whether 2,000 acres at Re.1 per acre, or 1,000 acres at Rs.2 per acre joins cannot matter much to the Commission, but it is a point of vital importance to the Company or individual who has to pay, especially if the interest involved represents a large acreage of non-productive land, or land that has not yet reached the profit earning stage, and I venture to think that had less per acre been budgetted for, the total realised would have been greater. Admitting that it was eventually found that the best way to raise the money was by an acreage assessment, was it not too early in the day to fix the rate, even tentatively, at Rs.2 per acre? Had this point been left over it would then have been open for Planters to say that they proposed to come in provided that so many acres joined the scheme. For instance, any one prepared to back it to the extent of Re.1 per acre on his holding would agree to join provided that 1,50,000 acres as a minimum did so—it being accepted that the scheme as it stands will cost Rs.1,50,000 per annum. Those who accept the scheme as it stands will place their minimum low, and others will come forward on the basis that they are prepared to subscribe at; and the probabilities are that owing to much greater support being forthcoming than is now the case it will be found that the great majority of these latter have not placed their minimum figure too high, and this alteration will not mean consigning the project to the melting pot again.

That the Commission properly worked will do a great deal to help us there can be no reasonable doubt, and to my mind one of the greatest benefits (and one not specially referred to by the Committee) will be that it will give us an organisation through which we can meet competitors in our labour market, and bargain with them so as to obtain our own share of what we both want. That any Commission will ever stop the adventurous spirit, or the one who wishes to leave this country for his country's good, from going elsewhere is unlikely, and so long as rates of pay vary from one district to another, or from one country to another (which will be always!) he will continue to go, but it may be that even now the coolie is beginning to realise that the higher pay ruling in some places, means corresponding disadvantages in other respects.

The idea is expressed that the Commission will not in future years cost so much as is now budgetted for, but I cannot see this, and think that before the problem is finally solved much more will have to be spent, or incidental expenses very much reduced, and no doubt the Committee which dealt with the matter went into these latter very fully, and may possibly have had facts and figures to guide them. If so, then there is little to be hoped for in that direction, and with only 3 Assistant Commissioners provided I would ask "what are these amongst so many?"

Yours faithfully,
J. AIRD.

Kinnacoorie Estate.
Kilkundah P. O., Nilgiris.

II

THE EDITOR,
The Planters' Chronicle,
Bangalore.

Dear Sir,—I fancy that most planters are in favour of some attempt being made to organise and supply labour which, from my point of view, the present Labour Commission does not propose to do. To make a start why not have a Limited Liability Co. for the benefit of shareholders only. There ought to be enough men, who would require its help or who are in favour of it, to take up the share necessary to finance the business. To begin with, I should say the following would be sufficient to attempt at first and should not be so expensive as the estimate now proposed by the Labour Commission.

(1) Have an agent in each recruiting centre to recruit, to make inquiries as to the status of maistries already employed (when required to do so), to ascertain the whereabouts of absconders, etc., Labour supplied to be charged for per head to those supplied and distributed as the Ceylon Labour Commission do theirs.

(2) Have all maistries registered by finger prints, which can be taken by employers or an agent. This would prevent

(a) the same man being registered twice over

(b) the crimping of maistries (though not of labour) presuming members agreed not to employ an unregistered maistry.

Yours faithfully,
O. W. MARDEN.

Seaforth, Nilgiris,
12th November, 1913.

Use of Explosives in Agriculture.

The EDITOR,
The Planters' Chronicle.
Bangalore.

Sir,—I was very glad to see Mr. Trelearan's letter on explosives, as it bears out what I have previously written you on the subject, but his letter further confirms one or two things which every one seems to doubt, *viz*, that dynamiting has been done out there for some years and with any marked results, that though it may primarily appear expensive the results are permanent; and it will bring back country which may be absolutely going out! manure sick, sour, exhausted. I do not think his remarks apply to *wet ground*; in this country soils are fairly free, whereas the country he writes of is very puggy naturally with a shallow surface soil in parts; to get the full benefit of shots I think this soil should be fairly damp, now would be just about ideal I think.

Since I have been here I have been too busy to do any real work but on a small patch of three year old tea I dynamited in May, I can now see a decided difference, but it is during, and at the end of the hot weather I hope to note more marked results.

I am just taking up the management of 1,000 acres of tea and there I intend making some careful experiments, on some of the very old tea chiefly.

You will notice Mr. T. mentions Rackarock which you see he says is far stronger than Gelignite.

The explosive people out here have apparently never heard of it.

It was, as far as I remember, slightly cheaper than Gelignite.

Yours truly,
COLIN HINDLEY.

Chundrapore Estate.
Mudigere P. O.,
Kadur District, Mysore State,
8th November, 1913.

Weed Killer.

THE EDITOR,
The Planters' Chronicle,
Bangalore.

Dear Sir.—Can the Scientific Department or any experimenter tell us any more about Arsenite of Soda as a weed killer?

Yours faithfully,
JNO. G. HAMILTON.

The Planters' Chronicle.

RECOGNISED AS THE OFFICIAL ORGAN OF THE U. P. A. S. I., INCORPORATED.

(Secretary's Registered Telegraphic Address "Planting," Bangalore.)

VOL. VIII. No, 48.] NOVEMBER 29, 1913 [PRICE AS 8.

THE U. P. A. S. I.

(INCORPORATED.)

Contents.

Before the next week's issue of December 6th, we hope to welcome the Planting Expert back to headquarters, full of practical and instructive experience gleaned during his extended tour. His stay will be of short duration as he will soon after his return be leaving for Coimbatore to attend the Agricultural Conference.

So varied and contradictory are the views expressed relative to quality of wild Para and Plantation Rubber, that we publish the opinions of two well-known users of both. The goal is worth winning and the prize obtainable by those who set their mind on the standardization and uniformity of this produce. The taste of the manufacturer must be studied and met. With him lies the award.

An instructive and convincing letter appears from Mr. Martin in reply to N. I. K. which should demolish for ever anything in the shape of direct recruiting. We consider that this letter throws an illuminating light on methods of recruiting. Mr. Martin could, we are sure, if he would only allow himself to do so, add much to our knowledge of the same, from his vast experience. His knowledge of the coolie and the recruiter, like Sam Weller's is "extensive and peculiar."

Though the letter on Nitrate of Lime savours of a gratuitous advertisement we publish it for the benefit of those who use Nitrate of Lime, and who might wish to stock it without loss.

A warning note is struck by Mr. Marden in his letter on Antestia Cruciata. One never knows, but the hint thrown out may prove valuable.

We trust that "One Interested" will find satisfaction, if not consolation, in Mr. Grove's reply.

It will be noted that the Government of Madras intend to establish a Pathological Institute of their own and do not propose to contribute to the Fund or address the Government of India, in accordance with the Resolution passed at the last Annual Meeting and forwarded to them.

The Book of Proceedings for 1913 has come to hand from the Printers and been posted to those who have already ordered it. The price has been reduced in the hope that every member of every District Association will take a copy, and thus reduce the cost and number of the unpurchased volumes to the Association.

RUBBER.

Wild vs. Plantation.

TWO EXPERT AND FLATLY CONTRADICTORY VIEWS.

By a curious coincidence, the humour of which it requires a dull brain not to see, we have this week Mr. Arthur du Cros, of the Dunlop Company, giving reasons at the Aboyne Clyde meeting why manufacturers cannot use plantation rubber freely, and Mr. Dundas-Mouat, in a letter to the Press, stating emphatically that they do use plantation, and even prefer it. Mr. du Cros is an authority on the manufacturing side, and his views are practically the same as those of Mr. R. T. Byrne, of the Leyland and Birmingham Co. We think he overstates his case, because we know tyre makers who prefer plantation rubber. Mr. Dundas-Mouat as an authority on plantation produce may perhaps have gone some distance in the other direction. In any case here are their respective views.

Mr. du Cros says:—" In my view there is one consideration in particular which has not been sufficiently recognised in considering the position of the plantation industry, and that is the complete failure of rubber planters to compete with wild Para rubber. Plantation rubber is something over £200 a ton cheaper than wild Para to-day. Some people have accounted for that by accusing manufacturers of being either ignorant or indifferent to the advantage of plantation rubber. Manufacturers are ordinary human beings, possessed as a rule with the average amount of intelligence, and they do not pay £200 a ton more for their raw material merely as a matter of amusement or because they are ignorant of the business in which they have been engaged for many more years than those who criticise them, or because they are either blind or indifferent to their own interests. There must be some other reason, and the reason, shortly stated, is this: that manufacturers cannot depend upon plantation rubber to give the same results as wild Para rubber. With manufacturers quality is the first consideration, and price is a secondary matter. Why is plantation rubber not so dependable as wild Para rubber? In my opinion the latex as it is taken from trees on a plantation, provided the trees are properly matured, is as good as the latex obtainable from wild Para trees. There are two reasons, in my view, why plantation rubber as finally offered on the market is not so good as wild Para.

"First, there is no uniformity observed in its preparation, and there can therefore be no uniformity in the manufacturing results. The manufacture of rubber is a very intricate process. Manufacturers find that plantation rubber which is apparently of good quality passes through their works, is manufactured into finished goods, and subsequently fails in use. These finished goods are sold on the market and involve them in loss and discredit. I think this uncertainty in the results given by plantation rubber is due to the way in which it is originally prepared. It is not cured or treated in the same way as wild Para rubber, and, above all, it is not uniformly treated by the different estates.

"That is one of the causes of the failure of plantation rubber to compete with wild Para. There is another. Plantation rubbers have been very indifferently graded. There are too many grades. You buy rubber from ten estates, and you will probably get ten different prepared lots, giving different results. I think these are the two chief reasons which account for the complete failure of rubber growers to compete with wild Para rubber.

Take a manufacturer dealing in a year with two, three, or four thousand tons of rubber. He has no use for little lots of rubber, all differing in quality in the methods of their preparation, which will give different results when manufactured into finished goods. He cannot run the risk of using them in his finest manufactures. Many of these rubbers are prepared by managers of estates who do not claim to be scientific men on this question, and who do not work to any particular rule. The first thing to deal with is the practical question of the preparation of rubber, which is at a discount on the market to-day because of defective methods employed in the industry. The elimination of wild Para seems to me to be a prize worth working for and winning. It is a question of organisation."

Mr. Dundas-Mouat says:—"We have been told price has fallen away to about 2s. per lb., because (1) the quality is so poor that manufacturers cannot and will not use it; (2) the method of preparation on the estates is all wrong; and (3) if the manufacturer were to use it he would require to scrap his machinery and put down special plant to treat it. I have taken the trouble to make inquiry and have gone into the whole subject with a gentleman who represents one of, if not the biggest manufacturers in America. His firm in normal times uses about 15,000 tons of all kinds of rubber annually, of which 8,000 to 10,000 tons is plantation. They find, up to the present time, that there are but two uses to which plantation rubber cannot be put so advantageously as fine hard Para, *e. g.*, the making of thread and the finest quality of cement or solution—for any other purpose it does equally well, and later I hope to show is preferred. Every motor tyre they manufacture—and I hesitate even to estimate the number of these annually put on the market—is entirely made of plantation rubber, except for the solution which cements the treads to the canvas carcass. They prefer crepe rubber and never buy smoked sheet, and they advise producers to continue to manufacture crepe. I have always understood we could look upon plantation rubber as being about 98 per cent. pure; my friend tells me that if they find it loses 1 per cent. they think something is wrong. He tells me that if plantation were selling at 60 cents (American) and fine hard Para at 45 cents it would pay them better to use plantation. So much for the alleged inferiority of plantation Para."

Mr. Dundas-Mouat traces the trouble to American failures and the Akron strikes. Manufacturers have been astonished at the price to which rubber has fallen, and are now anxious because they expect a sharp reaction. His friend informs him that buying with a view to the spring demand is about to commence, and there will be larger consumption with better prices. "Further, my informant positively states that manufacturers in general will find it possible at anything under 3s. per lb. to put more rubber in their manufactured articles and will unquestionably do so, with the result that consumption will thereby be enormously increased, irrespective of any new uses which may be discovered. I asked him if he could estimate the amount of fine hard Para annually required for uses which plantation could not fill, and he replied that his firm had gone into the question and the figure was not over 5,000 tons. He estimated also that the world's demand for 1914 will be 125,000 tons, with 175,000 in 1915, and provided no wild fluctuations occur, and barring wars and strikes, a good deal more later. Finally his answer to the question, 'What is wrong with plantation rubber?' was, 'Why, nothing.' As to the discrepancy in price between plantation and fine hard Pará, he suggests that Mr. Aker's reports have probably done the plantation industry more harm than we suspect, but the worst on that account is over.—*The Rubber World.*

CORRESPONDENCE.

Srivilliputtur,
22nd November, 1913.

The Labour Commission.

THE EDITOR,
The Planters' Chronicle,
Bangalore.

Dear Sir,—I wish N.I.K. had allowed you to publish his name with his letter which appeared in your issue of the 15th November, so that we could judge as to his past experience and the right to occupy so much of your space as would be entailed by giving him a full answer. I conclude his experience is small; at any rate, it is obvious that the time at his disposal has not been sufficient to study the subject of "direct recruiting." Not knowing anything about his personality, I am entitled to ask him a few questions to ascertain if there is any value in his implied advocacy of direct recruiting or in his seeming desire to see it made a branch of the business to be undertaken by the proposed Labour Commission of the U P.A S.I. Before doing so, I express my amazement at the ignorance he displays of the working of the Ceylon Labour Commission. The whole system was clearly explained by Mr. Farquharson at the General Meeting of the U.P A. S.I. in 1909. Perhaps the experience of N.I.K does not cover so remote a date, but even then the neglect to look up a few back numbers is inexcusable in one who has any interest at all in the Labour problem. We have indeed the experience of the Ceylon Labour Commission as a guide, and can therefore avoid its mistakes. The enthusiasm of the first Ceylon Labour Commissioner for "direct recruiting" was soon quenched by his employers in Ceylon who forbade its continuance for reasons that were absolutely sound. It was then relegated to the position of an "experiment" which had been abandoned. Now for my questions:—Has N.I.K. ever worked coolies supplied by some one else not belonging to the Estate? By a man in the position of a recruiter or say, such an one as would be the Agent of a Labour Commission? The most successful and the largest "direct" recruiting Agency extant in South India is that run by the Government of the Strarts and the F. M. S. Is N. I. K. aware that the immigration tax paid by the Estate to cover the cost is 4 dollars for each cooly imported, and that for every cooly whose name appears on the Estate Check roll an annual tax of 8 dollars per head is levied irrespective of other recruiting expenses? Does he know that most of these coolies are unattached men and that the proportion of females to males is about 13%? Does he think similar gangs of coolies would remain long on his Estate, or become attached to it in any way? Does he know that in spite of the "direct" recruiting so successfully carried out by so powerful an organization, planters from Malaya find it necessary to come over themselves to India and bring crowds of Maistries and Kanganies with them to help in recruiting coolies? The cost of all this is not included in the immigration tax. Does he know that the British Malay Rubber Company started the year 1912 with 237 coolies, that the cost of recruiting 1,336 coolies from India during the year was Rs.49,756 and that at the end of the year there was a balance of 613 coolies on the Estate? Some of these doubtless being coolies with which the year started, divide the total cost by the number of newly recruited coolies remaining, and the cost of recruiting in this instance comes to something like Rs.90 per head. Does he know that there are Estates in Malaya which were even in a worse Labour position? There were Estates much better off of course, but what would N. I. K. say if his Estate was by chance in the other category? To turn to another aspect, has N. I. K. ever recruited coolies and handed them over to the Manager of another Estate to work? I have personal experience of this also, and it makes me hot and cold all over when I think of it.

Mr. Editor, I have a confession to make. I am still doing it to a small extent. I know that the principle involved is absolutely wrong and unsound, but where I can find what I consider optimum conditions, *i.e.*, in the intention of the recruiter, the class of coolies, and most important of all, my absolute confidence in the ability and resource of the Manager of the Estate concerned, I am still trying it in order to see if there is a possibility even by a fluke, of making one success. Although everyone of us is doing his best, I find nothing to say in its favour. Why do I go on then? It is because I do not accept the position that because others have failed, therefore it is no use trying, and because I feel there are deeper dregs below what I have already swallowed, which I must drain before I finally give in.

Need I refer to the withdrawal of a promising South Indian Labour Department which had its headquarters at Coimbatore not so very long ago and its cause? I think not. I would not go into the other matters raised by N.I.K. were it not that his ignorance on one point makes me think his speculations on the others may be based on the same abysmal foundation. A large Indian Staff with insufficient supervision will not accomplish anything, while a small Native Staff well supervised is capable of surprisingly good work. It is quite possible to get reliable information (all other sorts are of course useless and even dangerous) by means of Indian subordinates with no particular facilities to help them, no training to start with (though they are quite susceptible to training) and with not overmuch intelligence, but not without check, the difference between success and failure lies in the check, by means of competent supervision. A knowledge that any information may be checked at any moment and sometimes with great rapidity helps, I may almost say ensures, reliability. How does the following report (a genuine one) strike N.I.K.? It happens to be one that requires no check, the man reporting knowing his business, having been in my service some years:—

"As per your order of 7—11—13 I send herewith an encumbrance certificate got from the Minkapuram Sub-Registrar's office, it does not appear that this Kangany has encumbered his properties. The documents executed in his favour are mentioned in the certificate except, a pro-note for Rs. 200. The certificate for this pro-note can be had from the office only by the parties concerned. I shall report further about this later on. A Government embossed paper was purchased by this Kangany from the Stamp Vendor but the purpose for which it was purchased is not known."

Would this help N. I. K.? I doubt it. It would probably mislead him and many another, in spite of its being true and reliable in every way. The Kangany would probably be regarded as an honest man, with his transactions duly registered. It requires interpretation before those who have insufficient knowledge of such things would understand it.

The purpose for which that stamped paper was purchased is not known. No, but it can be guessed, and it reveals a surprising depth of rascality on the man's part. His dishonesty of purpose and intention shines out as clear as day light, for it was purchased on the chance of it proving useful at some future date. It will be carried about until it has acquired that veneer able appearance, that well-known mixture of smoky cooly line and trouser pocket which combine to impart the odour of sanctity so necessary to the would-be forger, and will some day be produced to prove the genuineness of an ancient transaction prior to the Estate's claim, not necessarily indeed by its present holder, but by some future possessor who has paid for it far more than its face value. The ink used will be of a pale brown colour, none of it will be blotted, for it would be difficult to make alterations, even out of the same bottle of ink, which would look as if made at the same time, if blotting paper spoilt the tone of any portion. Everything will be provided for, except perhaps the time of its purchase may be overlooked, and the transaction may bear a date prior to the day when it left the Stamp Vendor—— and then......oh then! ... May I be there to see!

A rascal with such intentions may be dealt with in various ways, the simplest, and cheapest possibly is to buy the paper from him and tear it up. Knowing that his game is found out he may even become a reformed character but in any case he will have to be carefully watched.

N. I. K. doubts the efficacy of the distribution of pamphlets unless the distributor is prepared to make advances on the spot and takes the recruits away with him. Does one buy a cake of soap when one first sees the advertisement extolling its virtue? or does one wait until one wants soap, and then buys what has been so often recommended? It annoys me to have to write down so elementary a fact. that advertisement is a mere sowing of the seed, only a proportion of which falls on likely ground, where it takes time to germinate, and I may add sometimes a long time before the conditions turn favourable. The investigation of new recruiting areas has never been sufficiently nor systematically tried by South Indian Planters. We have done nothing like the same work in this direction as our competitors from oversea. I cannot say what it may prove to be worth. It is just possible, however, that it may be worth the difference between being able to make a profit on an Estate or abandoning it altogether.

I confess I do not understand the last para. of N. I. K.'s letter.

Mr. Editor, I only take up so much of your space because there may be hundreds of men for all I know who think with N. I. K. that "direct" recruiting of coolies is among our hopes for the future. I have not given the reasons or even any of them to prove that direct recruiting is based on unsound principles that must necessarily fail, as my letter is already so long. What is come by as the result of hard personal work is what is prized most by us all, what is easy come by is not considered so valuable.

The trite proverb I find applies to coolies as well as to other things.

Yours faithfully,
AYLMER MARTIN.

Coimbatore, 25th November, 1913.

Nitrate of Lime.

The EDITOR,
The Planters' Chronicle.
Bangalore.

Dear Sir,—With reference to the correspondence in your columns some time back in reference to the risk of storing this valuable fertiliser in a damp climate owing to its hygroscopic properties, we have the pleasure to inform our friends that we are now prepared to supply this fertiliser in 50 lb. air-tight tins, in which the Nitrate may be stored for any length of time in any climate without the slightest risk of the contents being in any way affected (*vide* our advertisement in this issue).

We are, Dear Sir,
Yours faithfully,
For T. Stanes & Co., Limited.
F. J. STANES.

Nilgiris, 22nd November, 1913.

Antestia Cruciata.

THE EDITOR,
The Planters' Chronicle,
Bangalore.

Dear Sir,—On the principle of "Prevention is better than Cure" I have had collected and killed since the middle of August last several thousands of this bug, and have been trying to find if any bunches of berries show signs of drying but have so far been unsuccessful. Both my Budaga and Tamil Maistries tell me they have always known this bug in coffee but did not know it did any harm. Very small bug are still being found in numbers which proves that breeding is not confined here to August and September. The better the field the more numerous the bug. I was told that on one estate in this district the crop was reduced by this antestia from, I think, 10 tons to 2½ tons, but am glad to say that other planters with whom I have corresponded do not seem to have noticed that their blossoms have not set or that they have suffered subsequently from this cause. Planters who doubt if they have many antestia would probably find out by offering 8 annas a 100 for them.

Coffee planters should be grateful to Hon. Secretaries of Planters' Associations if they would get statistics of what is being done in their districts to keep down this pest and publish the results in this paper.

Yours faithfully,
O. W. MARDEN.

Curzon Estate,
Kotagiri P. O, Nilgiris.
20th November, 1913.

Tea.

THE EDITOR,
The Planters' Chronicle,
Bangalore.

Dear Sir,—In reply to the letter by "One Interested" in the *Planters' Chronicle* of 15th instant *re* Loss in Weight on shipments of Tea to the

London Market, has your correspondent taken into account the Broker's Draft of 1 lb. per chest? If not, this clears the mystery.

As far as my experience goes, I always think I have done well if my loss does not exceed 1·80 lbs.%. Should the loss be more than 2%, it shows bad weighing in the Factory, unless of course, cases have been damaged *en route*.

"One Interested" is also rather liberal with his over allowance per chest, 2 oz. being ample.

I think I am right in saying that Brokers show no partiality between half and full chests, and that the full lb, is taken from both alike. A very useful sized sample it is too!

Yours faithfully,
R. N. C. GROVE.

Public Department

No. 1447.

Tropical Diseases.

From

The Hon'ble Mr. W. O. Horne, C.S.I., I.C.S.,
Ag. Chief Secretary to the Government of Madras,

To

The Secretary,
United Planters' Association of Southern India,
Bangalore.

Dated Fort St. George, the 17th November, 1913.

Sir,—With reference to your letter dated the 9th September, 1913, I am directed to state that as this Government have under contemplation a scheme for establishing a Pathological Institute at Madras, in which extensive facilities will be afforded for the teaching of tropical medicine locally and for the conduct of research work connected with tropical diseases, they do not propose to contribute to the endowment fund of the London School of Tropical Medicine or to address the Government of India in the matter.

I have the honour to be,
Sir,
Your most obedient Servant,
(Signed) ....
For Chief Secretary,

A SYSTEM OF ACCOUNTS FOR PRIVATE OWNERS

BY A PLANTER.

The plan of accounts here set forth will, I believe, be found useful and satisfactory to the average planter, the man who has an estate say from 100 to 300 acres.

A system of Book-keeping requires a foundation upon which the figures of the future may rest so evenly that when the time arrives to balance them, *viz.*, to agree the Dr. and Cr. sides—no difficulty will be experienced. Therefore it is necessary first of all to make out a statement of liabilities and assets. It is proposed to take as an example the affairs of "A" who owns an estate of 200 acres of Coffee and his financial year commences on 1st April, 1913. He adopts a system which will provide him with a Profit and Loss Account and Balance Sheet at 31st March, 1914. The result of the statement of liabilities and assets is as follows:—

BALANCE SHEET, 1ST APRIL 1913.

Liabilities (or credits)			*Assets* (or debits)		
Sundry Creditors	Rs.	215 0 0	Block Account	Rs.	50,000 0 0
Excess of Assets over liabilities which represents the Capital A has in the estate	Rs.	60,660 0 0	Labour advances outstanding	,,	500 0 0
			Cash in hand	,,	125 0 0
			,, at Bankers	,,	10,250 0 0
	Rs.	60,875 0 0		Rs.	60,875 0 0

This "opening Balance Sheet" is the basis upon which the accounts are built. The books to be used are:—

(1) Cash Book,
(2) Journal,
(3) Ledger.

The opening entries are made as follows:—

Assets.			
Cash in hand	Rs.	125 0 0	In Dr. Cash Column of Cash Book.
,, at Bank	,,	10,250 0 0	In Dr. Bank Column of Cash book.
Labour advances outstanding	,,	500 0 0	On Dr. side of account opened in the Ledger.
Block Account	,,	50,000 0 0	On Dr. side of account opened in the Ledger.
Liabilities.			
Sundry Creditors	Rs.	215 0 0	On Cr. side of an account opened in Ledger.
A's Capital	,,	60,660 0 0	On Cr. side of an account in Ledger

After posting these entries the totals on the debit and credit sides of the Ledger and Cash book (the cash book is treated as a Ledger account) will be equal.

It is presumed that the transactions of A for the 12 months April 1st, 1913, to 31st March, 1914, were as follows:—They are put in a summarised form but in practice these entries must be made as the transactions occur.

1.	Drew from the Bank for Office cash	Rs.	15,000	0	0
2.	Paid from Office cash on the following Accounts:—				
	(*a*) Superintendence ...	Rs.	2,400	0	0
	(*b*) Cultivation ...	„	6,240	0	0
	(*c*) Incidental Taxes etc. ...	„	1,075	0	0
	(*d*) Crop charges ...	„	2,000	0	0
	(*e*) New Buildings ...	„	3,000	0	0
3.	Paid sundry creditors balance due at 1st April by cheque ...	Rs.	215	0	0
4.	Advance for labour from office cash...	„	300	0	0
5.	Bought from X Company on credit tools, etc. ...	„	125	0	0
6.	Sold for cash (placed in Bank) a part of the coffee crop ...	„	20,000	0	0
7.	Sold on credit balance of crop ...	„	7,650	0	0
8	Recovered on account of labour advances (placed in office cash)...	„	350	0	0

These transactions are passed through the books of account, the accounts balanced and Balance Sheet prepared.

Journal.

		L F.	Dr.	Cr.
1914 March 31st,	Sundry Debtors— Dr ...	10	7,650 0	
	To Sales Account for crop sold on credit ..	5		7 650 0 0
„ ...	Cultivation charges— Dr ..	7	125 0 0	
	To sundry creditors for sundry tools purchased but not paid for at date ..	4		125 0 0
	Closing Entries.			
„ ...	Profit and Loss Account— Dr. .	11	11,840 0 0	
	To Superintendence ..	6	..	2 400 0 0
	„ Cultivation ...	7	...	6,365 0 0
	„ Incidental, taxes, &c. ...	8	...	1 075 0 0
	„ Crop charges ..	9	..	2,000 0 0
„ ..	Sales Account— Dr. ..	5	27 650 0 0	
	To Profit and Loss Account ..	11		27 650 0 0
„ ...	Profit and Loss Account— Dr. ..	11	5,810 0 0	
	To Capital account ..	1	...	15,810 0 0
	Profit transferred ..	0	...	

Dr. **Cash Account.** *Cash.*

1913		L.F.	Cash Rs.	A.	P.	Bank Rs.	A.	P.	1914		L.F.	Cash Rs.	A.	P.	Bank Rs.	A.	P.
April 11	To Cash in hand and at Bank ...	...	125	0	0	10,250	0	0	Mar. 31	By Cash contra ...	...	...			15 000	0	0
									Do	By Superintendence ...	6	2,400	0	0			
									Do	By Cultivation ...	7	6,240	0	0			
1914									Do	By Incidental Taxes etc.	8	1,075	0	0			
Mar. 31	To Bank Contra ...	...	15,000	0	0				Do	By Crop charges ...	9	2,000	0	0			
									Do	By Block Account (New building) ...	2	3,000	0	0			
Do	To Sales account crop sold ...	5	...			20,000	0	0	Do	By Sundry creditors ...	4	...			215	0	0
Do	To Labour advances recovered ...	3	350	0	0				Do	By Labour advances ...	8	300	0	0	...		
												15,015	0	0	15 215	0	0
									Do	By Cash in hand and at Bank ...	...	460	0	0	15,035	0	0
	Total Rs...	...	15,475	0	0	30,250	0	0		Total Rs...	...	15,475	0	0	30,250	0	0
April 1	To balance b/d Rs...	...	460	0	0	15,035	0	0									

Ledger.

A—CAPITAL ACCOUNT.

Dr.			Rs.	A	P				Rs.	A.	P	Cr.
1914 March 31st.	To Balance c/d ..		76,470	0	0	1913 April 1st.	By amount invested in Estate at this date ..		60,660	0	0	
						1914 March 31st.	„ Profit for year ...	J 1	15,810	0	0	
			76 470	0	0				76,470	0	0	
						April 1st.	„ Balance b/d ..		76,470	0	0	

BLOCK ACCOUNT.

Dr.			Rs.	A	P				Rs.	A.	P	Cr.
1913 April 1st.	To value of Estate at date ..		50,0000		0	1914 March 31st.	By Balance c/d ..		53,000	0	0	
1914 March 31st.	„ Cash (New Buildings) ..	C. B. 1	8,000	0	0							
			53 000	0	0				53,000	0	0	
April 1st.	„ Balance b/d .		58,000	0	0							

To be continued.

The Planters' Chronicle.

RECOGNISED AS THE OFFICIAL ORGAN OF THE U. P. A. S. I., INCORPORATED.

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THE U. P. A. S. I.

(INCORPORATED.)

Contents.

We are able to welcome the Planting Expert back to Head Quarters, but unfortunately only for a short stay, as he leaves for Coimbatore on the 7th.

The Proceedings of a largely attended Meeting of the Mundakayam Planters' Association is published, much of which is of general interest. Mr. Richardson's speech on the Labour Question, appears to us not only popular of what must occur, but is supported by previous examples. What has once happened is likely to occur again.

The Labour Commission continues to attract attention and to lead to varied views, and this week's correspondence appears immensely attractive, and we welcome as new correspondents Messrs. Newcome and Mann. The latter's letter almost answers the doubts and suspicions of the former, and we hope that both will continue to give us the benefit of their leisure moments. Such new correspondents are ever welcome, and give direct encouragement to others to air their views and opinions, and the more these are ventilated, the easier (though their task is not enviable) will be the duties of the Labour Committee to assimilate divergent and conflicting ideas, when submitting their final scheme to the U. P. A.

Mr. Mead contributes a letter which will doubtless receive due attention but we don't altogether agree with him,as the income that would be derived for the support of the proposed Labour Commission appears to us of far too fluctuating a nature—we name only two products—Coffee and Cardamoms as far too uncertain.

Mr. Hunt suggests that three Assistants are insufficient and thinks this number should be increased to six: but though we agree with him in his opinion we cannot agree with him as to the means by which the additional six are to be secured. In the letters published there is much food for thought.

Mr. Richardson writes on the subject of the International Rubber Exhibition and a circular letter has been issued by the Secretary, embodying his opinion that the Rubber Industry of Southern India should be represented.

DISTRICT PLANTERS' ASSOCIATIONS.

Mundakayam Planters' Association.

Minutes of the General Quarterly Meeting of the Mundakayam Planters' Association held at the Travellers' Bungalow on Saturday, November 8th, 1913, at 10 a.m.

PRESENT.—Mesers. R. Harley (Chairman), G. Atkins, B. M. Behr, E. S. Conner, E. R. Gudgeon, L. Goldsmith, Gav. Greig, Ashton, Hamond, H. M. E. Howson, Eric Hall, J. Y. M. Henderson, C. M. Hunnybun, H. B. Kirk, R. Lescher, R. Lester, C. Martin, R. C. Milbank, A. W. Ruxton, J. A. Richardson, J. H. B. Sullivan, F. Simmons, R. Tait, J. Wedderspoon, George West, R. L. M. Yeates, and Edwin Vincent (Honorary Secretary). *By Proxy*:—Mr. F. A. W. Meumann. *Visitors*:—Messrs. Wilkie, Ellis, Hodgins, Jourdain, Pitcairn and R. D. Anstead.

The Chairman said it gave him great pleasure on behalf of the Association to announce the visit of Mr. R. D. Anstead, to whom a cordial welcome was extended.

Business.—1. The Minutes of the last meeting were taken as read.

2. The Honorary Secretary read the report and recommendations of the Finance Committee as to the disposal of the surplus funds lying to the credit of the Association at the Bank. The recommendations of the Committee were discussed seriatim :

(*a*) That a donation be given to the Mundakayam Church. After some discussion Mr. Hamond proposed and Mr. Henderson seconded that this matter be left to the member individually.

(*b*) That a Planters' Hall be built. This proposal met with unanimous approval. Mr. Harley said that with the permission of his Directors he was agreeable to the sale or lease of some three acres of land at Manikal for the site. Mr. Richardson said he would be pleased to recommend this scheme to his Co-Directors and that, as the land near Mr. P. J. Zachariah's Bazaar was being surveyed, the proposed site might be included by the surveyor and a plan sent Home. After some discussion the original Finance Committee was selected to go into the matter and Mr. Harley was asked to submit a plan. It was also decided that the Honorary Secretary should send round a subscription list.

3. The Honorary Secretary read the report of the Scientific Officer Committee, the adoption of which was proposed from the Chair and seconded by Mr. Hamond. On this subject Mr. R. D. Anstead made some very interesting remarks, in the course of which he said he thought it would be a good thing for Southern India to have a combined Rubber Growers' Association and that this Association should obtain the services of a good man as assistant to the proposed Mycologist in Bangalore. Eventually two proposals were formulated :—(1) That this Association strongly supports the resolution passed at the U. P. A. S. I. Annual General Meeting asking Government for a Mycologist as we think it absolutely necessary to the Rubber Planting interests of Southern India. Proposed by Mr. J. A. Richardson and seconded by Mr. Eric Hall. (2) That the Honorary Secretary be requested to write to the other Associations of South India and ask for their support to a scheme for the formation of a Rubber Growers' Association and the employment by that Association of an Assistant Scientific Officer. Proposed from the Chair and seconded by Mr. H. B. Kirk.

4. *Report of the Bangalore Delegate.*—The Delegate Mr. Ashton Hamond said:--

Owing to the time that has elapsed between the meeting at Bangalore and this one, there is very little information that I can give you on the proceedings that took place, that you do not already know. Doubtless most of you, have not only read the report of the meeting but the general correspondence, criticisms, etc., that have appeared in the *Planters' Chronicle*, which discuss the most important items, and have noticed those which really concern this Association.

Of course, many of the subjects on the Agenda were more fully discussed, but mostly in Committee, which were not reported on.

The number of subjects that actually concerned us were really very few. The only time that the product of Rubber was brought up was when Ceara was discussed and very little was said about that.

I cannot say that our industry was very strongly represented considering its importance and the acreage that it covers in Southern India.

The most important discussion that concerned us, naturally was the Labour Question. From what I gathered from every member present, it was quite evident that there were no Districts situated as we are this year and, I trust, will continue to be.

I think I may say that most Associations welcome the idea of the proposed Labour Commission Scheme.

We had a whole day's discussion, and as is usual with the subject, we got no further, but resulted in the appointing of a Sub-Committee, consisting of seven members, to draw up a proposed scheme to be laid before the members of all the local Associations, and of which you have all received the minutes, for a Labour Commission, to be run much on the same lines as the Ceylon Labour Commission is. We had present Mr. Scoble Nicholson, the Ceylon Labour Commissioner, who welcomed the idea of South India proposing to form a Commission the same as Ceylon. He gave us a rough out-line of the principles he worked on.

As this subject is on the Agenda for discussion at this meeting, I need not here say anything further on the subject.

Weights and Measures.—A resolution was passed that the British Government be approached in order that the standardisation of weights and measures may become law. This of course would not affect us, being in a Native State, but, I think, it is a very necessary subject that we should go into, and I have a proposition to bring forward at this meeting.

Manures.—It was reported by the Scientific Officer that in one or two cases, samples of manure had been sent to him for analysis, the contents of which did not come up to the guarantees given.

He impressed on us the importance of this and especially advised us all to pay attention to this matter.

Representatives of two manure firms were present and defended themselves on the plea, that likely as not the samples sent, were not fairly taken. They were greatly in favour of having their supplies analysed, but only asked that a fair sample be sent to the Scientific Officer.

As we have the pleasure of the presence of Mr. Anstead, I have no doubt he will say something on this matter.

Mundakayam Post Office.—With regard to the improvement of our Local Post Office, I met the Hon'ble Mr. Barber and asked him to approach the Postmaster-General on the subject.

I was, at the time, awaiting some information from the local authorities here, who promised to forward me the information that I required, but I regret this did not reach me in time. However, I spoke to Mr. Richardson, who was then just off to Madras, who promised to see the Postmaster-General and do what he could for us. I have since heard from him, and, by all accounts, he does not appear to have been able to get any further satisfaction from the Postal authorities. No doubt Mr. Richardson will have something to say on the subject.

Subscription to the U. P. A. S. I.—As instructed I increased our cess to 2 annas provided other Associations fell into line. I think there were two Districts, who were not paying 2 annas per acre, but the Delegates of each of these promised to approach their local Associations on their return and I have since read that one of these has already raised its subscription to two annas.

I might mention that I was fortunate in having Mr. Richardson close beside me and whom I consulted in the matter before raising ours to 2 annas.

London School of Tropical Medicine.—A stronger support is required for this. I do not think it is a matter that really interests any individual planter, but it is more of a subject for our respective Companies to support, if they wish.

Planters' Benevolent Fund—Mr. Abbott informed us, and it will be seen from the accounts circulated, that up till now only two appeals have been made for support.

It is evident that this Fund does not get its proper measure of support from planters generally, and as remarked by the Chairman in his address, the prosperous times of the past two years are probably accountable for this. I think that this institution should receive more consideration.

General.—Hearing that Mr. Anstead contemplated a tour, I requested him to include this District in his programme. I think he will find more interesting subjects now than the eradication of weeds which was about all we had to show him at the time of his last visit.

I was instructed to vote for Mr. Richardson as a member of the Committee, but he refrained from accepting any official position for next year, which I think you will all regret to hear.

With regard to all other subjects on the Agenda, most of them referred to coffee, and local interests in British India, and unless any member has any question to ask, I do not think I need occupy more time.

In conclusion I must thank you for the honour of electing me as your representative of this Association.

The Chairman said with regard to the increased cess promised by Mr. Hamond, that as now all other Associations are coming in he thought Mr. Hamond was justified in making this promise. With regard to the Planters' Benevolent Fund the Chairman said that he was sorry the Honorary Secretary's request for subscriptions had been poorly responded to so far and hoped members would come along with subscriptions for this worthy object.

Regarding Postal matters Mr. Richardson said he had had no opportunity of meeting the Postmaster-General in Madras but the matter was receiving attention. Mr. Harley proposed a very hearty vote of thanks to Mr. Ashton Hamond, which was seconded by Mr. Richardson and carried unanimously. At the conclusion of the discussion the Honorary Secretary announced that promises had been made by the members present of subscriptions amounting to Rs.225 to the Planters' Benevolent Fund.

5. *System of Voting.*—Mr. Eric Hall called the attention of the Association to the fact that at a previous meeting certain motions had been carried on a show of hands which might have been attended with different results had the voting been carried out on an Acreage Basis according to Rule. After some discussion Mr. Richardson proposed that voting, on less important subjects, might be done on a show of hands but, that on matters more vitally affecting the interests of the community, it would be done on Acreage Basis. Seconded by Mr. Hall and carried unanimously.

6. *The Proposed U.P.A.S.I. Labour Commission.*—The Honorary Secretary read a letter from Mr. J. J. Murphy declining to participate in the scheme, also a letter from Mr. Harley suggesting that the Scheme would not be of any use in Mundakayam without extradition. Mr. Richardson said: " Mr. Chairman and Gentlemen. In rising to speak in favour of the proposed Labour Commission I feel I am rather against a stone wall as far as Mundakayam is concerned and am likely to be met with the argument that Mundakayam has no need of use for the Commission, having abundance of labour and low advances at the present moment.

" This is, no doubt, a very strong argument which I cannot deny and one which, with the present depressed state of the Rubber market, must necessarily carry weight with Directors and Agents at Home.

" We have had a lot of correspondence in the *Chronicle* for and against the Commission. My old friend Mr. Mead wrote a very strong criticism on the Labour Committee's proposal a lot of which was quite sound but there are several points on which I cannot agree with him and I think on the whole his letter an uncalled-for attack on the first attempt at combination, amongst Southern Indian Planters, which has ever shown signs of success.

" He divides the state of the Planting Industry into three classes :—

1. The Districts that have no labour troubles or scarcity of labour.

2. The Districts which are not badly off but have plenty of room for improvement.

3. The Districts which are always short.

" I thought, at the time, this was rather a dangerous statement to make as it advertises our West Coast Labour rather much for my taste and Ceylon and the Straits will, no doubt, take advantage of the information and for this reason I refrained from replying to Mr. Mead's letter. However, as he has made this blissful state of affairs in Cochin public himself, the harm, if any, is already done.

" Mundakayam, apparently, also exists under this happy state of affairs.

" Under these conditions, I must admit, that the Labour Commission is not going to benefit you for the moment, but I would like to ask you how long this is going to continue. Is it likely that Ceylon and the Straits both pushed for labour, are going to sit still and leave our sanctuary alone—I think not. The Straits, who ran amok, during the Rubber boom both in capitalisation of the Companies and rates of wages now talk of reducing the latter. Their Indian Labour is under contract for a certain period at certain wages and if they attempt to break their promises they will have a general upheaval with their present labour and have to look for pastures new, and where more likely than the West Coast, if they are not there already.

" I have been told that the West Coast cooly does not emigrate and is not likely to do so but, I am certain, means will be found to persuade them to do so.

" Not many years ago certain Districts represented on the U. P. A. who paid lower wages than the average, laughed at the idea of their Labour leaving them yet not much later a lot of that labour found its way south and they have now fallen from their high state and at present figure in Mr. Mead's class two.

" In a few years, if not sooner, Mundakayam and Cochin will also be there and if the present state of affairs continue it will not be long till we shall fall to class three.

" The Straits wish to reduce their rates of wages and ask for combination amongst the planters to do so and with absolute combination they may carry it through, and only on the same lines may we hope to keep our labour.

" There is an old saying, though not generally applied to labour troubles but none the less applicable that 'There is safety in numbers' and that is exactly the position to-day while all our Districts and recruiting Agencies are scrapping amongst themselves, Ceylon and Straits collar the Labour.

I would ask you, therefore, to give the Scheme your serious consideration. I know that few, if any, are in a position at the present moment to promise support and I must point out that your opinions naturally carry weight with Directors and Agents at Home and even if you are still averse to the Scheme I would ask you to send a Delegate to the Extraordinary General Meeting of the U. P. A. S. I., who should be appointed at this meeting.

" Remember we have the future to look to as well as the present and the Commission, if unanimously supported, would be a very powerful body and the cost of working it proportionately less, according to the acreage subscribing.

" Up to date South Indian Planters have shown a deplorable want of combination and at the last U. P. A. meeting the result of the deliberations on the labour question looked as if the dawn of a better day was breaking.

" No matter where you go, at Home or abroad, or what industry you like to take you will find its conditions of working controlled by combination of similar trades, and why not the Planting Industry of Southern India?" After a lengthy discussion Mr. Hamond proposed that the Honorary Secretary write to the U. P. A. S. I. that this Association is not in favour of this Scheme. This was not seconded and Mr. Behr proposed "That the members of this Association do not see the necessity of the proposed Labour Commission but they are prepared to lay the matter before their Employers." Seconded by Mr. Kirk and carried.

7. *The Sri Mulam Popular Assembly 1914.*—The Honorary Secretary read letter from Chief Secretary to Government sanctioning separate representation from Mundakayam. Mr. Ashton Hamond, proposed by Mr. Kirk and seconded by Mr. Lescher, was elected to represent the Association. The Delegate was instructed to place before Government:

(*a*) The question of grazing land and the stray cattle nuisance.
(*b*) Roads.

8. *Weights and Measures.*—Permission was given to Mr. Hamond to withdraw his resolution on the subject.

9 *Rubber Freight Rates.*—Mr. Richardson proposed that the U. P. A. S. I. be requested to approach the Ceylon P. A. and the Straits P. A. with a view to getting combined action on the question of reduction of Rubber Freight Rates to London. Seconded by Mr. Hamond and carried unanimously.

10. *New Bridge and Cart Road to Vellanadi Estate.*—Mr. Atkins proposed that Government be asked to pay for half the cost of the bridge and to contribute towards the upkeep of the Road. Seconded by Mr. Richardson and carried unanimously.

11. *Cattle Pound in Mundakayam.*—Mr. Kirk proposed that the Association respectfully ask Government to start a Cattle Pound in Mundakayam and that the cost of the Pound be met from the Association Funds. Seconded by Mr. Hall and carried after some discussion.

12. *The Erathupetta-Kanjirappalli Road.*—Mr. R. Lescher was given permission to withdraw his resolution on this subject as it is understood that estimates have been included in this year's Budget for the repair of the road,

Koshy's Hotel, Kottayam.—Mr. Richardson said that we are in danger of losing this Hotel as the rent is too high for the Manager to run it at a profit. He proposed that this Association should ask the Peermade Association for its support in subsidising the Hotel. Seconded by Mr. Kirk.

Mr. Hamond proposed as an amendment that we pay a set reasonable sum as the present rates charged in no way enable the Manager to make a profit sufficient to guarantee our advances to him. I would recommend that Rs.5 per day should be charged. Seconded by Mr. Hall. The amendment was defeated on a show of hands and the original resolution carried by 15 votes to 3.

14. *Oil Fuel.*—The Honorary Secretary read letter from Burma Oil Company and Asiatic Petroleum Company with regard to the establishment of a Depôt in Mundakayam.

Mr. Hamond proposed that the Oil Agents be approached as to what is the lowest supply from them necessary for the establishment of a Depôt in Mundakayam also that figures be obtained from the Peermade Association so that they may combine with us. Seconded by Mr. Eric Hall. Mr. Hamond added that he had consulted with Mr. P. J. Zachariah, who is a large retailer in the District and who had co-operated with him in the matter.

15. *Correspondence.*—Read letter from Mrs. J. R. Forbes Fraser thanking the Association for its vote of condolence on the death of the late R. A. Fraser of Kuppakayam and enclosing a donation of five pounds (£5) to the Association. The thanks of the Association for this donation are recorded and it was decided to place the amount to the credit of Mr. Kirk's fund for the erection of memorials in the Peermade Church to the late R. A. Fraser and the late F. H. Hall.

Read letter from Mr. J. M. Jacob, G.B.V.C., offering his services as Veterinary Surgeon. No discussion.

16. *Date and Place of Next Meeting.*—The next meeting of the Association will be held by kind invitation of Mr. Eric Hall, at the Boyce Bungalow, on Saturday, February 7th, 1914.

"After the conclusion of the business the Chairman announced that Mr. Richardson had very kindly offered a Tennis Cup for competition between Mundakayam and Peermade. The meeting then terminated with a vote of thanks to the Chair,

(Signed) R. HARLEY,
Chairman.

(„) EDWIN VINCENT,
Honorary Secretary.

CORRESPONDENCE.

Cowcoody,
Somwarpet, N. Coorg,
November 27th, 1913.

The Labour Commission.

THE EDITOR,
The Planters' Chronicle,
Bangalore.

Sir,—May I ask whether, if a man is rash enough to remain outside the Labour Commission, in other words, the big Companies' Labour Trust, he is liable to have his labour drawn away, in other words, crimped, by the said Trust? If so, whether he could sue the Trust as a Corporation? Whether intended or not, the effect must be to try and draw labour from coffee planters (mostly small independent proprietors and therefore generally well satisfied with labour as it is) into the bloated tea and rubber companies. Coffee planters are being politely asked to "walk into the parlour" and tax themselves for their own undoing. This is shown by the Trust giving (in the case of two Associations to my knowledge) about one fortnight to decide whether one should take this grave step or not.

Yours faithfully,
L. NEWCOME.

Palapilly P. O.,
November 30th, 1913.

THE EDITOR,
The Planters' Chronicle,
Bangalore.

Sir,—Mr. Aird's letter in your issue of the 22nd and a private letter from Mr. Waddington are responsible for my writing once more to the *Chronicle*.

I am less disinclined to do so as I have a suggestion to offer and not merely destructive criticism.

The whole matter lies in a nutshell. Some people think they will get good value for their money and others do not.

I have already heard from home from my directors that they do not approve of joining as they do not see the use of paying for other people's troubles who are less fortunately situated. I have also heard on reliable authority that one of the biggest South Indian firms objects to the scheme as being unlikely to give them value for their money.

Everyone will admit that the scheme as outlined will bear heavily on proprietors of immature areas.

My suggestion therefore is, that the money required should be raised on crops actually harvested. To do this it would be necessary to take into consideration the value of the different products.

The scale I should suggest would be as under:—

Cardamoms	...	4/- per pound.
Rubber	...	2/- per pound.
Tea and Coffee	...	-/8 per pound.
Pepper	...	-/4 per pound.

The cess therefore would only be paid by producers in accordance with the rough value of their crop.

Immature acreages would not be taxed and this I consider is not only likely to be popular but is fair. Now clearings are for the most part opened either with local labour or by short time labour.

Take this property as an example. The only permanant coolies I employ are for tapping or coolies I have introduced with a view to turning them into tappers in the next year or two. At present my Company would not be called upon to contribute largely but I should have the benefit of the Agency with respect to my actual tappers and 6 years from now when I hope we shall be producing 1¼ million pounds of rubber I should be paying as much as estates producing 3¾ million pounds of tea. At the same time the cost to the Company per pound of rubber would be insignificant.

I do not say that my scale of values is right or that it would never need revision but if money were raised this way there would be less feeling that there was too much *4d.* for *9d.* in the matter,

I feel strongly that such a method of raising the requisite money would appeal far more strongly to proprietors than an acreage cess and be far more equitable.

The Commission will never be of equal value to all places but most proprietors would, I think, stand in and not grumble.

I am, Sir,
Yours etc.,
A. H. MEAD.

THE EDITOR,
The Planters' Chronicle,
Bangalore.

Dear Sir,—Opinions seem to differ as to "the benefits" we are to gain from the establishment of a Commission and some doubts are expressed as to whether we shall get our money's worth, if the scheme is a "non-recruiting" one. Many people think that "recruiting" is essential to make the scheme a success.

Now it is undoubtedly necessary to evolve a scheme that will give us a maximum of help in our labour troubles, at a minimum cost. Details will of course have to be threshed out at the coming meeting. Meanwhile let everyone who has a suggestion to make come forward now, and make it. To practise what I preach—here goes—

Suggestion No. I. The Scheme as drawn up by the Labour Committee seems to me to have too much head and tail and not enough body. The success of the scheme will undoubtedly depend on "the European Assistant Commissioners." No. 3 in my opinion is not enough. Make it 6. Money to pay for them can be saved by 500 off Commissioner's salary and by saving a bit over advertisements that will probably never be read.

No. II. Let the Commission be "a labour controlling and Recruiting Agency (call it "The S. India Labour Bureau" to prevent confusion with Ceylon Labour Commission) and let it be a means of bringing the man in want of work and the man wanting workers together. I am aware that recruiting means many difficulties cropping up in the way of advances, travelling expenses - and deciding where the recruited cooly shall be sent. But these can be surmounted.

No. III. No suggestion has so far been made as to restricting advances. Competition and bidding for the services of the cooly has caused advances to go up to an exorbitant sum. A limit should I think be imposed; and no sum above that limit should be recoverable at law.

Yours faithfully,
THOS. HUNT.

The Labour Commission.

THE EDITOR,
The Planters' Chronicle.
Bangalore.

Sir,—So much has been written by many able Planters about the proposed Labour Commission, that I approach the subject with diffidence; but there are one or two stock phrases and questions, that are always being quoted by those, either asking for information on the subject, or opposed to the scheme. The first of importance is "we are to pay Rs.2 per acre." This seems to hit everyone, and in some cases is cause enough to condemn, and throw out the scheme. Men on estates of 300 acres exclaim "we don't lose Rs.600 per year in bad debts and advances." What I want to point out is—that no one is asked to pay Rs.2 yer acre per annum. When drawing up the proposed Labour Commission-Report, (which is still in a very skeleton form), the committee had to put themselves on the right side in the matter of finance, and they fixed a *maximum* of Rs.2 per acre *for the first year*, the subscription *may* be *less*, it is not to be more. Everyone can understand that in the first year there will be heavy initial expenses, hence the request for Rs.2 per acre. If planters will look at the rate of subscription at, say a maxium of Rs.1-4 (roughly speaking) per acre. it may be even less, it does not sound so very heavy. The amount asked for being Rupees *six* per acre to cover *five* years. The scoffers might drop this condemning cry of Rs.2 per acre.

Another question frequently asked: "What benefits are we to derive from this Labour Commission, if they are *not* going to recruit labour for us?" Can any man in his senses think that by paying Re.1-4 per acre, he can sit in his office and order in to his estate as many coolies as he requires, and have them supplied? This seems to be what some planters expect.

Now some of the benefits I take it we are to receive for Re.1-4 per acre:

1. Help will be given to Proprietors and Managers to trace defaulting maistries, and so recover something *occasionally*, which at present is not recoverable.

2. Help will be given to maistries in their country to trace defaulting coolies, who have taken advances from two or more maistries, and the estates to which they have been traced will in some way square up with the maistry, who had given the previons advance. Enquiries in both these instances, if carried through the nearest labour depôt, in the defaulters own

country, will I think greatly help to trace defaulters; whereas a warrant sent out is only returned, with the words "the whereabouts of the accused is unknown," and the case is struck off the magistrates' file in a short time. On the other hand the defaulters name would be kept in the books at the nearest depôt, and the defaulter hun ed up from time to time and when he did return to his country, he would be caught.

We cannot expect to see immediate and great improvement in our labour the first year or two, but I think that when the maistries and coolies realise that if they take advances from two or more estates, they are systematically hunted from year to year, they will give up the practice; and so apart from recovering advances from defaulting maistries, where we now get 20 coolies on a contract made for 40, (which is about the average) we shall get in 30 or even more. *This is a point I want particularly to emphasize*, that we shall in a few years be getting 25% more labour for advances given out. Surely it is worth while risking Re.1-4 per acre for these aims and results.

I have read with interest what has been written by such well-known men as Messrs. Danvers, Nicolls, Martyn, Barber, &c., who are all for a Labour Commission, though perhaps on slightly different lines (which will be decided upon at the meeting of the delegates) and I hope other names equally well known, and carrying as much weight, will come into line, and a combined Labour Commission of some sort will be started; if not on the scale anticipated at the U. P. A. S. I. Meeting, let us start on a smaller scale, and the maistries who find their interests looked after will surely come (honestly let us hope) to those estates who hold out a helping hand to their labour.

Yours faithfully,
H. M. MANN.

Sidapur, Coorg,
1st Dec. 1913.

Peermade, 27th November, 1913.

International Rubber Exhibition.

THE EDITOR,
The Planters' Chronicle,
Bangalore.

Dear Sir,—By last mail I heard from the Directors of 5 Rubber Companies and one private proprietor offering support to the scheme of having Southern India represented at the coming International Rubber Exhibition. It seems to me that the people in London are the best judges in this matter and from the letters I have got they seem to think it advisable that Southern India should be represented. There is little time to waste if we intend to do anything, and I should be greatly obliged if you would sound the Honorary Secretaries of District Associations on the matter. If anything is to be done a Committee should be appointed to go into the ways and means without delay.

Yours faithfully,
J. A. RICHARDSON.

A SYSTEM OF ACCOUNTS FOR PRIVATE OWNERS BY A PLANTER.

Labour Advance Account.

Continued.

Dr. Cr.

1913 April 1st.	To Balance outstanding at date ...		500 0 0	1914 March 31st.	By Cash .	C. B. 1	350 0 0
1914 March 31st.	„ Cash ...		300 0 0	„	„ Balance c/d ...		450 0 0
			800 0 0				800 0 0
April 1st.	„ Balance b/d ...	C. B 1	450 0 0				

SUNDRY CREDITORS.

Dr. Cr.

1914 March 31st	To Cash ..	C. B. 1	215 0 0	1913 April 1st	By Balance due ..		215 0 0
	To Balance c/d ..		125 0 0	1914 March 31st	By Cultivation tools bought on credit from X company .		125 0 0
			340 0 0				340 0 0
				April 1	By Balance b/d ..		125 0 0

Dr. **Sales Account.** Cr.

1914 March 31st.	To Profit and Loss a/c ...	J. 1	27,650	0	0	1914 March 31st	By Cash ...	C, B. 1	20,000	0	0
							By Sundry debtors ...		7,650	0	0
			27,650	0	0				27,650	0	0

Dr. SUPERINTENDENCE. Cr.

1914 March 31	To cash ...	C. B. 1	2,400	0	0	1914 March 31	By Profit & Loss a/c. ...	J. 1	2,400	0	0
			2,400	0	0				2,400	0	0

Dr. CULTIVATION CHARGES. Cr.

1914 March 31	To Cash ...	C. B. 1	6,240	0	0	1913 March 31	By Profit and Loss a/c. ...	J. 1	6,365	0	0
"	" Sundry creditors ...	J. 1	125	0	0						
			6,365	0	0				6,365	0	0

Incidental Taxes, &c.

Dr. Cr.

			Rs.	A.	P.				Rs.	A.	P.
1914 March 31	To Cash ...	C. B. 1	1,075	0	0	1914 March 31	By Profit & Loss a/c. ...	J. 1	1,075	0	0
			1,075	0	0				1,075	0	0

CROP CHARGES.

Dr. Cr.

1914 March 31	To Cash ..		3,000	0	0	1914 March 31	By Profit & Loss a/c. .	J 1	3,000	0	0

SUNDRY DEBTORS, *for proceeds outstanding on Sales.*

Dr. Cr.

1914 March 31	To Sales Account ..		7,650	0	0	1914 March 31	To Balance c/d ...		7,650	0	0
			7,650	0	0				7,650	0	0
April 1	To Balance b/d ...		7,650	0	0						

PROFIT AND LOSS ACCOUNT.

Dr. Cr.

1914 March 31	To Sundries ..	J 1	11,840	0	0	1914 March 31	By Sales Account ..	J 1	27,650	0	0
Do.	To Capital account balance (profit) transferred ..	do	15,810	0	0						
			27,650	0	0				27,650	0	0

Balance Sheet at 31st March, 1914.

Dr.	Rs.	A.	P.	Cr.	Rs.	A.	P.
To Sundry Creditors	125	0	0	By Block Account ...	53,000	0	0
„ Capital Account	76,470	0	0	„ Labour advances outstanding ...	450	0	0
				„ Proceeds outstanding on coffee sales...	7,650	0	0
				„ Cash in hand ...	400	0	0
				„ Cash at Bankers...	15,035	0	0
Rs.	76,595	0	0	Rs.	76,595	0	0

BLOCK ACCOUNT:—this is also termed " Plantation Account" in " Estate Account " and represents the cost and development of the Estate. All expenditure on immature cultivation is debited to this account.

SUNDRY CREDITORS:—If numerous, separate accounts should be opened for each.

CAPITAL ACCOUNT:—This account is merely a *measure* of the amount of capital and does not represent the capital itself. The capital itself is represented by assets less the liabilities.

The account is increased by profits, or by cash or by property, and decreased by losses or withdrawings cash or property.

If A was to pay his household expenses out of estate moneys, they should not be carried to the Profit and Loss Account but may be shown in the Balance Sheet as a deduction from the Capital Account, thus:—

			Rs.	A.	P.
Capital as per last Balance Sheet	...	...			
Deduct Household expenses	...	...			
Add Profit (if any) ...	...	...			
Capital of this date ...	...	...			
		Rs.			

ACCOUNTS WITH AGENTS.—If the produce was to be shipped to London for sale the following procedure would be adopted.

When the Agent's return is received, the Sales Account should be credited with the gross amount, and the Agent's account in the Ledger debited. Only expenses the Agent may have incurred should be credited to his account and debited to the correct expense accounts. Any moneys remitted by the Agent will be credited to his account.

AGENTS'S ACCOUNT.

Dr.	Rs.	A.	P.	Cr.	Rs.	A.	P.
To Sales Account gross amount of sale proceeds ...	30,000	0	0	By Sale Charges a/c	100	0	0
				„ Cash ...	29,900	0	0
Rs.	30,000	0	0	Rs.	30,000	0	0

SALES ACCOUNT.

Transfer to Profit & Loss ...	30.000	0	0	By Agent's a/c ...	30,000	0	0

SALE CHARGES ACCOUNT.

To Agent's a/c. for sale charges ...	100	0	0	Transfer to Profit and Loss ...	100	0	0

INDIA.

Tea Export.—A recent official report states that the demand for tea across the north-west borders, particularly in Afghanistan, is increasing enormously. The value of the exports of Indian tea has risen from just under 6 lakhs of rupees in 1910-1911 to 9¾ lakhs in 1912-1913, this rapid growth of trade being confined exclusively to Indian green tea. The same period shows an even more remarkable increase in the consumption of foreign teas, the value of which has risen from 1¼ lakhs to 23½ lakhs.—*United Empire.*

FREE RAW MATERIALS IN THE U. S. A.

The Tariff committee of the United States Scrap Rubber Dealers' Club, have requested us to call attention to the fact that under the new Tariff Act which has just became effective, new rubber waste as well as old will be admitted free. The present Tariff Act contains the following paragraph covering rubber:—

" India-rubber, crude and milk of, scrap or refuse India-rubber fit only for re-manufacture."

Under this provision, new rubber waste as well as old rubber waste, receives free entry; that is, can be imported free of duty. Previously this was impossible on account of the old paragraph containing the words " not worn out by use "; therefore any shipments containing even a slight percentage of new waste were assessed in their entirety at 10 per cent.

The change should eliminate a good percentage of shortages which have occurred heretofore; as shipments will not be subjected to the same amount of handling and scrutiny as heretofore. The element of uncertainty is also banished. Formerly any shipment was subjected to duty charge upon arrival by customs authorities, even though it contained a very slight percentage of new waste perhaps inadvertently thrown in.—*The India-Rubber Journal.*

The Planters' Chronicle.

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(INCORPORATED.)

Contents.

We reproduce from the "Indian Planters' Gazette and Sporting News," a short account of the gathering of wild rubber in South America. Colonel Fawcitt describes it as "brutalizing." It must be seen to be believed, for no such experience can be compared with it in India, where the cooly labour has been invariably well treated and well looked after from the days of the Pioneers in all our Agricultural Industries.

The Gold Coast are taking the wise precaution of insisting on cocoa and rubber plants and seeds being disinfected before landing. Next year we all hope that the Pest Act on the same lines will be in force in India.

The opening address by Professor T. B. Wood on Agriculture before the British Association at Birmingham is of such general interest to all that we make no excuse for publishing it can only regret that space prevents us giving our readers the whole of it. Great as are the strides that have been made in recent years in Scientific Agriculture, it is marvellous that these results should be the outcome of practically only twenty-five years. Agriculture is a restless Science, and we may expect new methods tending to the increased fertility of our soils from scientific research. Next week we hope to complete this very valuable address.

We also publish from the "Board of Trade" Journal the exports of Rubber from Brazil, Peru and Bolivia.

Mr. Barnard's letter on the Labour Question will doubtless receive the attention due to it from the Labour Committee, and prove a distinct help in framing some laws for the better supervision of maistries. The form attached appears capable of improvement but it is a valuable suggestion.

Mr. Rutherford has written a most interesting report of his experiences with Green Bug and his method of attacking and checking it. It contains suggestions on the method of spraying of the highest practical use and is bound to be appreciated by all planters; and we hope that others will follow in his footsteps, as suggested by Mr. Anstead. Not only in regard to Green Bug, but "many other problems." We draw particular attention to the Planting Expert's letter, and emphasize his word of warning.

RUBBER.

The tragedy of wild rubber gathering is graphically described in the November number of the *Contemporary Review* by Mr. John H. Harris. "The natives may tramp through the forest for days; provisions may run short or go bad, and the workers must sleep in rude shelters composed of a few palm branches and twigs, which are a poor protection from tropical tornadoes. Whilst searching for rubber the unclothed natives suffer terribly from those tropical rains. I have seen them many a time almost convulsed with rigours as the pitiless cold rain has poured down on their naked or half-clad bodies. In utterable misery, with chattering teeth and countenances livid with cold, they pluck wildly at pieces of bark or forest leaves in the hope of obtaining some shelter, if only for the head. Fever frequently follows, and then, too often, further tornadoes, the fording of a swamp or heavy cold dews exact the final penalty; and the rubber gatherer has gone to those Elysian fields of which he dreams—where rubber does not grow." The writer quotes Colonial Fawcett's letter to *The Times* last year, in which the Indians searching for rubber in the upper reaches in the Amazon is thus described: "I have seen batches of Indians covered by 'sekiti,' a species of leprosy, or lying in rows in filthy sheds, too weak from fever to get about, piling up debt, which has to be expunged in rubber. Nobody seems to care. The whole business is brutalising."

By way of contrast to the condition of the unfortunate creatures engaged in the collection of wild rubber in some parts of South America a statement as to labour conditions on rubber plantations recently issued by the Agent of the Federated Malay States is quite cheerful reading. On estates of over 100 acres the total number employed in the Federated Malay States in 1912 was 188,050, an increase of 22,00 over 1911. Wages for Tamil men ranged from 7*d.* to 1*s.* 10*d.* per day, for Javanese from 9*d.* to 1*s.* 6*d.* per day and Chinese from 11*d.* to 2*s.* 4*d.* per day. It must be understood, however, that housing accommodation and medical attendance are provided by the employers. Official reports show that the labourers are able to save considerable sums of money out of their wages. The amount remitted by money order from the Federated Malay States to India increased from Rs.3,403,00 in 1911 to Rs.4,295,646 in 1912, and the amount to the credit of Indians in the Savings Bank was £53, 890 of which about £16,350 is said to have beeen deposited by labourers.—*Indian Planters' Gazette and Sporting News.*

GOLD COAST.

IMPORTATION OF COCOA AND RUBBER PLANTS AND SEEDS.

The Board of Trade are in receipt of an Order-in-Council dated 21st July, 1913 which was made by the Governor in Council under the "Destructive Pests Ordinance, 1912" and which notifies that it shall not be lawful for any person to import into the Gold Coast Colony any Cocoa or Rubber plants or seeds into the Colony, except through the Ports of Accra and Secondee.

All such cocoa or rubber plants or seeds must be disinfected before shipment in a manner approved by the Director of Agriculture, and accompanied by a certificate to the effect that such disinfection has been duly and properly carried out; otherwise they will be destroyed, or landed at such place as the Director of Agriculture may direct for disinfection under the supervision at the expense of the Importer.—*Board of Trade Journal.*

THE BRITISH ASSOCIATION AT BIRMINGHAM.

SECTION M.

Agriculture.

Opening Address by Prof. T. B. Wood, President of the Section.

I propose to follow the example of my predecessor of last year, in that the remarks I wish to make to-day have to deal with the history of agriculture. Unlike Mr. Middleton, however, whose survey of the subject went back almost to prehistoric times, I propose to confine myself to the last quarter of a century—a period which covers what I may perhaps be permitted to call the revival of agricultural science.

Twenty-five years ago institutions concerned with the teaching of agriculture or the investigation of agricultural problems were few and far between. I do not propose to waste time in giving an exhaustive list, nor would such a list help me in developing the argument I wish to lay before the section. It will serve my purpose to mention that organised instruction in agriculture and the allied sciences was already at that date being given at the University of Edinburgh and at the Royal Agricultural College, whilst, in addition, one or more old endowments at other universities provided courses of lectures from time to time on subjects related to rural economy. Agricultural research had been in progress for fifty years at the Rothamsted Experimental Station, where the work of Lawes and Gilbert had settled for all time the fundamental principles of crop production. Investigations of a more practical nature had also been commenced by the leading agricultural societies and by more than one private landowner.

In these few sentences I have endeavoured to give a rough, but for my purpose sufficient, outline of the facilities for the study of agricultural science twenty-five years ago, at the time when the county councils were created. Their creation was followed almost immediately by what can only be called a stroke of luck for agriculture. The Chancellor of the Exchequer found himself with a considerable sum of money at his disposal, and this was voted by Parliament to the newly created county councils for the provision of technical instruction in agriculture and other industries.

Farmers were at that time struggling with the bad times following the wet seasons and low prices of the 'seventies and eighties' and some of the technical instruction grant was devoted to their assistance by the county councils, who provided technical instruction in agriculture. Thus, for the first time, considerable sums provided by the Government were available for the furtherance of agricultural science; and, although at first there was no general plan of working and every county was a law unto itself, the result has been a great increase of facilities for agricultural education and research.

Almost every county has taken some part. The larger and richer counties have founded agricultural institutions of their own. In some cases groups of counties have joined together and federated themselves with established teaching institutions. For my purpose it suffices to state, without going into detail, that in practically every county, in one way or other, attempts have been made to carry out investigations of problems related to agriculture.

Twenty years after the voting of the technical instruction grant to the county councils, Parliament has again subsidised agriculture in the sh[illegible]e of the Development Fund, by means of which large sums of money [illegible]ave been devoted to what may be broadly called agricultural science. It seems to me that the advent of this second subsidy is an occasion when this section may well pause to take stock of the results which have been achieved by the expenditure of the technical education grant. I do not propose to discuss the results achieved in the way of education, although most of the technical instruction grant has been spent in that direction. It will be more to the point in addressing the Agricultural Section to discuss the results obtained by research.

The subject, then, of my address is the result of the last twenty years of agricultural research, and I propose to discuss both successes and failures, in the hope of arriving at conclusions which may be of use in the future.

Agricultural science embraces a variety of subjects. I propose to consider first the results which have been obtained by the numerous practical field experiments which have been carried out in almost every county. I suppose that the most striking result of these during the last twenty years is the demonstration that in certain cases phosphates are capable of making a very great increase in the crop of hay, and a still greater increase in the feeding value of pastures. This increase is not yielded in all cases, but the subject has been widely investigated, and the advisory staffs of the colleges are in a position to give inquirers trustworthy information as to the probability of success in almost any case which may be submitted to them. This is a satisfactory state of things, and the question naturally arises: How has it come about?

On looking through the figures of the numerous reports which have been published on this subject, it appears at once that in many cases the increase in live-weight of sheep fed on plots manured with a suitable dressing of phosphate has been twice as great as the increase in weight of similar animals fed on plots to which phosphate has not been applied. Now about a difference of this magnitude between two plots there can be no mistake. It has been shown by more than one experimenter that two plots treated similarly in every way are as likely as not to differ in production from their mean by 5 per cent. of their produce, and this may be taken as the probable error of a single plot. Where, as in the case of many of the phosphate experiments, a difference of 100 per cent. is recorded, a difference of twenty times the probable error, the chances amount to a certainty that the difference is not an accidental variation, but a real effect of the different treatment of the two plots. The single-plot method of conducting field trials, which is the one most commonly used, is evidently a satisfactory method of measuring the effects of manures which are capable of producing 100 per cent. increases. It was good enough to demonstrate with certainty the effects of phosphatic manuring on many kinds of grass land, and it is to this fact that we owe one of the most notable achievements of agricultural science in recent years.

Another notable achievement is the discovery that in the case of most of the large-cropping varieties in potatoes the use of seed from certain districts in Scotland or the northern counties of Ireland is profitable. This is another instance of an increase large enough to be measured accurately by the single-plot method. Reports on the subject show that seed brought recently from Scotland or Ireland gives increased yields of from 30 to 50 per cent. over the yields produced by seed grown locally for three or more years.

That the single-plot method fails to give definite results in many cases where it has been used for manurial trials is a matter of common knowledge. Half the reports of such trials consist of explanations of the discrepancies between the results obtained and the results which ought to have been obtained. The moral is obvious. The single-plot method, which suffices to demonstrate results as striking as those given by phosphates on some kinds of pasture land, signally fails when the subject of investigation is concerned with differences of 10 per cent. or thereabouts.

Before suggesting a remedy for this state of things it will be well to consider the allied subject of variety testing, which has been brought into great prominence recently by the introduction of new varieties of many kinds of farm crops. In testing a new variety it is necessary to measure two properties—its quality and its yielding capacity—for money-return per acre is obviously determined by the product of yielding capacity and quality as expressed by market price. I propose here to deal only with the determination of yielding capacity. The determination of quality is not allied to manurial trials.

In attempting to determine yielding capacity there has always been a strong temptation to rely on the measurement of obvious structural characters. For instance, in the case of cereals many farmers like large ears, no doubt with the idea that they are an indication of high-yielding capacity. Many very elaborate series of selections have been carried out, on the assumption that large grains, or large ears, or many ears per plant implied high yield.

We may take it as definitely settled that none of these characters is trustworthy, and that the determination of yielding capacity resolves itself into the measurement of the yield given by a definite area. The actual measurement, therefore, is the same as that made in manurial trials, and is, of course, subject to the same probable error of about 5 per cent.

It follows, therefore, that it is subject to the same limitations. Variety trials on single plots, and that is the method commonly used, will serve to measure variations in yielding capacity of 30 per cent. or more, but are totally inadequate to distinguish between varieties the yielding capacities of which are within 10 per cent of each other.

Numbers of such single-plot trials have been carried out, with the result that many varieties with yielding capacities much below normal have almost disappeared from cultivation, and those commonly grown do not differ greatly from one another—probably not more than 10 per cent.

Ten per cent. in yielding capacity, however, in cereals means a return of something like 15*s.* to 20*s.* per acre—a sum which may make the difference between profit and loss; and if progress is to be made in manuring and variety testing, some method must be adopted which is capable of measuring accurately differences in yield per unit area of the order of 10 per cent.

The only way of decreasing the probable error is to increase the number of plots, and to arrange them so that plots between which direct comparison is necessary are placed side by side, so as to reduce as much as possible variations due to differences in soil. Thus it has been shown that with ten plots in five pairs the probable error on the average can be reduced to about 1 per cent., in which case a difference of from 5 to 10 per cent. can be measured with considerable certainty.

Such a method involves, of course, a great deal of trouble; but agricultural science has now reached that stage of development at which the obvious facts which can be demonstrated without considerable effort have been demonstrated, and further knowledge can only be acquired by the expenditure of continually increasing effort. In fact, the law of diminishing return hold here, as elsewhere.

It appears, then, that for questions involving measurements of yield per unit area, such, for instance, as manurial or variety trials, further advance is not likely to be made without the expenditure of much more care than has been given to such work in the past. The question naturally arises: Is it worth while? I think the following instance shows that it is:—

Some years ago an extensive series of variety trials was carried out in Norfolk, in which several of the more popular varieties of barley were grown side by side at several stations for several seasons. In all, the trial was repeated eleven times. As a final result it was found that Archer's stiff-straw barley gave 10 per cent. greater yield than any other variety included in the trials, and by repetition of the experiment the probable error was reduced to 1½ per cent. The greater yield of 10 per cent., being over six times the probable error of the experiment, indicates practical certainty that Archer barley may be relied on to give a larger crop than any of the other varieties with which it was compared. One difficulty still remained. It was almost impossible to obtain anything like a pure strain of Archer barley. Samples of Archer sold for seed commonly contained 25 per cent. of other varieties. This difficulty was removed by Mr. Beaven, who selected, again with enormous trouble, a pure high-yielding strain of Archer barley. Since this strain was introduced into the Eastern Counties the demand for it has always exceeded the supply which could be grown at Cambridge and at the Norfolk Agricultural Station, and it is regarded by farmers generally as a very great success.

The conclusion, therefore, is that a 10 per cent. difference is well worth measuring, that it cannot be measured with certainty by the single--plot method, and that it behoves those of us who are concerned with field trials to look to our methods, and to avoid printing figures for single-plot experiments which may very well be misleading. Almost everyone thinks himself competent to criticise the farmer, who is commonly described as too self-satisfied to acquaint himself with new discoveries, and too conservative to try them when they are brought to his notice. Let us examine the real facts of the case. Does the farmer ignore new discoveries? The largely increasing practice of consulting the staffs of the agricultural colleges, which has arisen among farmers during the last few years, conclusively shows that he does not; that he is, in fact, perfectly ready to avail himself of sound advice whenever he can. Is he too conservative to try new discoveries when brought to his notice? The extraordinary demand for seed of the new Archer barley quoted above, and for seed of new varieties generally, the continuous advance in the prices of phosphatic manures, as the result of increased demand by farmers, the trade in Scotch and Irish seed potatoes, all show how ready the farmer is to try new things. The chief danger seems to be that he tries new things simply because they are new, and he may be disappointed if those who are responsible for the new things in question have not taken pains to ascertain with certainty that they are not only new but good. Farmers are now-a-days in what may be called a very receptive condition. Witness the avidity with which they paid extravagant prices for single tubers of so-called new, but inadequately tested, varieties of potatoes some years ago, and in a less degree the extraordinary demand for seed of the much-boomed French wheats, and the excitement about nitrogen for soil or seed inoculation. Witness, too, the almost universal failure of the new potatoes and French wheats introduced during the boom, and the few cases in which nitrogen gave any appreciable result. The farmer who was disappointed with his ten-guinea tuber, his expensive French wheat, or his culture of nitrogen cannot but be disillusioned. Once bitten, twice shy. He does not readily take advice again.

Let us, therefore, recognise that the farmers of the country are ready to listen to us, and to try our recommendations, and let that very fact bring home to us a sense of our responsibility. All that is new is not therefore, necessarily good. Before we recommend a new thing let us take pains to assure ourselves of its goodness. To do so we must find not only that the new thing produces a greater return per acre, but that the increased return is worth more than it costs to produce, and we must also define the area or the type of soil to which this result is applicable. This implies in practice that each field trial should confine itself to the investigation of only one, or, at most, two, definite points, since five pairs of plots will be required to settle each point; that the experimental results should be reviewed in the light of a thorough knowledge of farm book-keeping, and that accurate notes should be taken of the type of the soil, and the area to which it extends, and of the various meteorological factors which make up the local climate. At present we are not in possession of a sufficient knowledge of farm accountancy, but there is hope that this deficiency will be removed by the work of the Institute for Research in Agricultural Economics, which has recently been founded at Oxford by the Board of Agriculture and the Development Commission. The excellent example set by Hall and Russell in their "Survey of the Soils and Agriculture of the South-Eastern Counties," an example which is being followed in Cambridge and elsewhere, seems likely to result in the near future in a complete survey of the soils of England which will make a sound scientific basis for delimiting the areas over which the results of manurial or variety trials are applicable.

Reviewing this branch of agricultural science, the outlook is distinctly hopeful. New fertilisers are coming into the market as, for instance, the various products made from atmospheric nitrogen. New varieties of farm crops are being produced by the Plant-breeding Institute at Cambridge, and elsewhere. It is to be hoped that the work of the Agricultural Economics Institute at Oxford will throw new light on the interpretation of experimental results from the accountancy standpoint. Finally, the soil surveys on which the colleges have seriously embarked will assist in defining the areas over which such results are applicable. It only remains for those of us who are responsible for the conduct of field trials to increase the accuracy of our results, and the steady accumulation of a mass of systematic and scientific knowledge is assured. It will be the business of the advisory staffs with which the colleges have recently been equipped by the Board of Agriculture and the Development Commission to disseminate this knowledge in practicable form to the farmers of this country.

One more point, and I have finished this section of my address. I have perhaps inveighed rather strongly against the publication of the results of single-plot trials. I quite recognise that the publication of such results was to a great extent forced upon those experimenters who were financed by annually renewed grants of public money. Now-a-days, however, agricultural science is in a stronger position, and I venture to hope that most public authorities which subsidise such work are sufficiently alive to the evils attendant on the publication of inconclusive results to agree to continue their grants for such periods as may suffice for the complete working out of the problem under investigation, and to allow the final conclusions to be published in some properly accredited agricultural journal, where they would be readily and permanently available to all concerned. This would in no wise prevent their subsequent incorporation in bulletins specially written for the use of the practical farmer.

So far I have confined my remarks to subjects of which I presume that every member of the section has practical experience, subjects which depend on the measurement of the yield per unit area. These subjects, however, although they have received far more general attention than anything else, by no means comprise the whole of agricultural science. Certain scientific workers have confined their efforts to the thorough solution of specific and circumscribed problems. I propose now to ask the section to direct its attention to some typical results which has been thus achieved during the last twenty years.

The first of these is the development of what I may call soil science. Twenty years ago the bacteriology of nitrification had just been worked out by Warington and by Winogradski. The phenomena of ammoniacal fermentation of organic matter in the soil were also fairly well established. The fixation of atmospheric nitrogen by organisms symbiotic on the leguminosae had been definitely demonstrated. Fixation of nitrogen by free-living organisms had been suggested. but was still strenuously denied by most soil investigators. No suggestion had yet been made of the presence in normal soils of any factor which inhibited crop production. The last twenty years have seen a wonderful advance in soil science. Our knowledge of nitrification and ammoniacal fermentation has been much extended. The part played by the nodule organisms of the leguminosae has been well worked out, has seen a newspaper boom, and a subsequent collapse, from which it has not yet recovered. But the greatest advance has been the discovery of the part played by protoza in the inhibition of fertility.—*Nature.*

(*To be Continued.*)

BRAZIL. PERU. BOLIVIA.

EXPORTS OF RUBBER FROM THE AMAZON BASIN, *via* PARA, IN SEPTEMBER, 1913

H. M. Consul at Para (Mr. G. B. Michell) reports that the quantity of rubber exported from Para, Manaos, Inquitos, and Itacoatiara during the month of September, 1912 and 1913, was as follows:—

——	Fine.	Medium.	Coarse.	Caucho.	Total.
September 1912—	Kilogs	Kilogs.	Kilogs.	Kilogs.	Kilogs.
To United States...	542,737	116,300	453,169	129,404	124,1610
To Europe ...	824,822	126,816	144,143	173,694	126,9475
Total...	1.367.559	243.116	597.312	303,098	251,1085
September 1913—					
To United States...	620,311	173.489	326.228	181,698	130,1723
To Europe ...	867.141	76.769	160.191	243,711	134,7812
Total...	1,487,452	250,258	486.416	425,409	264,9535

Kilog 2.2016 lbs.—*The Board of Trade Journal.*

CORRESPONDENCE

Munderi Estate, 4th December, 1913.

The Labour Commission.

THE EDITOR,
The Planters' Chronicle,
Bangalore.

Dear Sir,—In regard to the scope of the Labour Commission as detailed by Mr. Nicolls in your issue No. 44, I think item 4 regarding "supervision of maistries" requires some amplification.

To effectually supervise maistries a scheme somewhat on the following lines appears necessary and I do not see any insuperable difficulties in its accomplishment.

Imprimus. All Estate Superintendents who are members of the Commission should be called upon to submit a list of maistries employed on their estates at the time, and also a list of all maistries whose names appear in the Check Roll for the last two years or any other suitable period. This might be done in the form enclosed giving the particulars shown in the headings. These lists when collected should be compared and a complete register of maistries, past and present, drawn up. Copies of the Register should be supplied to each Asst. Commissioner who should make it part of his duties to personally see the maistries noted as working on Estates in his section and further the accuracy of each Estate Superintendent's information should be checked by the Commission's native staff. In this manner all "good" maistries could be identified and rascals who are under advance to more than one Estate discovered. The Commission could then afford to take the risk of guaranteeing the "good" maistries and by paying particular attention to coolies of such maistries in respect to items 1, 2, and 5 of Mr. Nicoll's letter can bring home to *All* maistries the desirability of being registered by the Commission.

Yours faithfully,
N. A. S. BARNARD.

Name.	Personal appearance. Height, age, &c.	Period working on estate.	Average amount of periodical advances.	Average Daily gang of coolies.	Supt's Opinion.	Asst. Comr's Remarks.

Saklaspur.

Green Bug in Mysore.

THE EDITOR,
The Planters' Chronicle,
Bangalore.

Dear Sir,—One now sees very little correspondence *re.* above pest and as the season is on us when it may be likely to crop up in parts of districts where so far it is unknown, I think that your readers may find of interest the experiences of one who has just gone through an attack and had a big area infected.

At the beginning of outbreak in April last, I had no Sprayers and so to try and keep outbreak in hand I had big gangs on removing all wood on which bug could be found; putting this wood into sacks on spot and then burning it. Though this work at time was then approved, I am now of opinion that with a product like coffee it was wrong, and that I should have done better to have waited for Sprayers and in the meantime confined my attention to removing ants' nests instead, as they were spreading the scale. In the case of a single tree it might be of use to remove all wood on which pest is, but even then it stands to reason that there must be a lot of Scale which is not visible to the eye, and so is only wasting good material with no benefit. I should advise anyone who has only just had his estate infected, to spray only taking care to spray not only the trees attacked but also several trees all round them, and not to remove any wood except perhaps to prune trees out, so that spray can get at them better. In an infected estate, if one finds a lot of either the Red, or small Black ants on trees, the chances are that Scale is present also.

Coffee is not an easy tree to spray, and it was with this work that I found a lot of difficulty from a planter's point of view, especially if area infected is big, as one has to do work as cheap as possible and yet it must be thorough to be of any use. I found it as well to teach coolies to use sprayers with only water in them at first, as it is not at all an easy matter to get them to understand. Any one can pump stuff out of sprayer, but not only is this in my opinion useless, but also very expensive. What one wants is that pressure is first got up well behind spray, and then emulsion will be thrown well into tree, if the nozzle of the sprayer is not held too near the part to be sprayed. These two facts are hard to teach, but they make all the difference, both in the way the pest is killed, and also in the amount of fluid used. A man who gets good pressure behind spray and holds his nozzle well off from the part being sprayed, will cover twice the area of a man who simply pumps the stuff on and holds his nozzle right up, and what is more the latter's work, though the tree will be soaked, will not kill like the former's, as it does not get at the bug in the same way. I found that a gang of sprayers, if working well, could be seen quite a distance off by a fine mist over trees, whereas if the pressure was not being kept up, or the nozzle was not being held right, one did not see this.

I used as fluid in sprayers. Rosin 1, Washing Soda 1, Navy Bar Soap 1, to 4 gallons of water. The above kills well, and I should not advise anyone at first outbreak to try any experiments with any other, till they have got the whip hand. But the above is very strong, and I found that as soon as I had got a whip hand, that an emulsion made up with half the amount of Soda did well, and also there is a doubt in my mind as to whether the Soap is necessary at all? Anyway I should strongly advise any one to use the best soap only, as I found in one instance when I had to use a cheap soap, for about a week, that the whole of my gang got bad eyes from the irritation of it, and I myself was none too happy I found here that when a big area has to be sprayed it is better to make a man work up one side and down the other of each row, going backwards the whole time, thus not only does he not have to pass through trees already done, but it also has the advantage of his not spraying a fellow worker as is the case if two men are working on the same row.

In making the solution I found that there was no need to reduce the Rosin to a fine powder, but if one smashed it up into small lumps it was quite sufficient and labour is thus saved when one is making a big quantity.

I found a big native sugar boiler a grand thing to make a quantity in, as one can then put in say 50 lbs. of each ingredient and sufficient water to make a stock solution, each gallon of which will when added to a kerosene tin of water make 4 gallons of fluid for spraying. In this way one has very little to carry in estate, except water, as a little solution goes a long way. An old petrol tin is a very useful thing to carry the stuff about the estate in.

During the main outbreak I used the Eclair No. 1 Sprayer with a double nozzle and found it very satisfactory, but it is difficult to keep the pressure up, and also after continual wear, it wants a lot of adjusting. I have also tried "Four Oaks" and Holder Pressure Sprayers. The latter I think are ideal, but they will want a lot of looking after, or they will not stand much wear. I am however glad to say since the latter sprayers arrived I have had not much use for them, as at present the trees on this estate seem to be free from scale, and the only place one finds any, is in ants' nest where it has been harboured by them.

The Fungus that attacks the "Green Bug" appeared early in the rains, and was most satisfactory, especially on the Sprayed area. On some trees it did not appear at all till almost the end of rains. I however found that if one carried some fungus infected branches to these latter trees that one could very soon in this way get Fungus to breed on them also.

I expect however that our Assistant Scientific Officer, now that this pest has been with us for quite a while, will have been able to collect a lot of data which will be of use to estates who have the Pest, as though we have a knowledge of one way of keeping it in hand still I conclude with the opportunity he has had of studying the present outbreak, he will be able to soon tell us something more of its life history, and the influence different works such as tillage and manures may have on combating pest. I believe that I am right in saying that one is now working rather in the dark as regards this scale, and that it is not improbable if more was known about its life and movements during the period when climatic conditions are not favourable for breeding; especially in relation to the coffee tree; one might be in a better position to tackle it. With us in Mysore where Coffee is the staple product, the more we can know about this pest the better, as I believe I am right in saying that so far the scale has been found on no other product in the Coffee districts in Mysore, and that the reports that it exists on the native crops in the open country, have still to be proved. I think the Green Bug (*Lecanium Viride*) is being confused with the young of another kind, which it is very like, and which I know has been in most parts for years. One often finds the suckers of a jungle stump covered with the young of this other species; and it is likely to give one a shock if they do not know how to distinguish between the two—especially if found in a Coffee Estate.

Yours faithfully,
E. W. R.

No. 1010/1913.

Office of the Planting Expert,
Bangalore,
5th December, 1913.

THE EDITOR,
The Planters' Chronicle,
Bangalore.

Dear Sir,—E. W. R's interesting letter is most welcome, would that others would follow his example and give us the benefit of their practical experiences with Green Bug and many other problems.

At the beginning of the outbreak last April it was fondly hoped that it was purely sporadic and so E. W. R. and others were advised by the Scientific Department to use drastic measures with the idea of stamping it out once for all. Moreover there were no sprayers on estates despite frequent warnings given in former years that the pest would one day make its appearance and that all estates should keep sprayers and spraying material ready as an insurance. To wait for sprayers to come from Europe appeared futile and hence the need for drastic pruning methods. With sprayers in hand, and I trust that now there is no estate in South Mysore without them (I wonder if this is really the case ?) I agree with E. W. R. that spraying is the best thing to do.

E. W. R. tells us how to spray, and our thanks are due to him for his most valuable practical hints. As to the mixture I believe it the best. Of course there are lots of other mixtures which will kill scales more or less, but personally I believe this to be the best. It can as E. W. R. says be made weaker once the scale is got in hand, but I think the soap is necessary.

With regard to sprayers, an Auto-spray type is the best as it avoids the necessity of pumping and automatically keeps up a big pressure behind the spray which E. W. R. finds so necessary. The Holder is a good type but expensive and the Honorary Secretary of the Council of the Mysore Planters' Associations has been put in possession of price lists and details of several other equally efficient and cheaper Auto-sprayers. The Scientific Assistant who gave him his information can also help in this matter.

The fungus no doubt under favourable climatic conditions does a lot of good, but it will not grow in dry weather. It should certainly be spread when it makes its appearance by tying fungus infected branches into trees not yet infected.

There must also, I think, be an organised campaign against Ants though these will be difficult to exterminate.

Trees which have been attacked by Scale though saved by spraying will undoubtedly be weakened and they should be manured accordingly. In fact as I have often said to resist the attack of this or any other pest the trees should be maintained at the highest pitch of vigour and health.

The young of *Lecanium viride* is easily confused with that of *Pulvinaria psidii*, the Mealy Bug, and planters should endeavour to distinguish between these scales.

As E. W. R. says there is a lot still to be learned about this pest. In the monsoon it will be found sheltered in ants' nests chiefly and it is undoubtedly carried over periods unfavourable to it largely by the aid of Ants.

In conclusion let me once more remind and warn planters that there will probably be a big general outbreak of this pest in the early months of January. It should be watched for most carefully and tackled directly it appears. Once more is there anyone who has not got his sprayers, rosin, soda, soap, &c., anyone who has not made every precaution to fight this pest, anyone who does not know it when he sees it ? If so let him at once take the necessary precautions and remember that he is a danger to the whole planting community if he is going to neglect the pest and allow his estate to become a nursery from which it can spread to his neighbours. It is to deal with such that a Pest Act is necessary, but I firmly hope there are no planters so selfish and careless in South Mysore.

Yours faithfully,
RUDOLPH D. ANSTEAD,
Planting Expert.

The Planters' Chronicle.

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(INCORPORATED.)

Contents.

A valuable paper from the Scientific Officer on the results of Compost making by Mr. Wilkins, of Hoscottay is contributed, and with the accompanying table will prove most interesting.

The Philosophy of Manuring which we extract from the *Gardener's Chronicle* shows the value of investigation which confirms the old philosophy as practised at Rothamsted. It also, if read correctly, confirms the necessity of soil analysis, if the agriculturist is to get the full benefit of his soil.

Mr. Cyril Warren of Trinidad gives a short account of tapping some Ceara Plants in his nursery.

We conclude Professor Woods' address which will be read with much interest, though dealing largely with the fattening of cattle; but those portions that refer to selection of wheat seed, bring home the enormous value of seed selection. That the Famers of England are ready to receive information and benefit by experiments is clearly shown. The Planters of Southern India are no less intelligent and receptive. The indigenous agriculturist is harder to move and much more conservative in his ideas.

We publish an invigorating letter from Mr. Danvers whose reappearance in these columns is ever welcome, not only to ourselves, but to our readers. It marks with appreciative approval the efforts of others to keep in the straight line and not be led away by "the light that leads astray." Even where and when he differs with others, his remarks are always to the point.

A "Potential Competitor" and "Dyspeptic" also add their *quota.*

We are obliged to Mr. Clarke for furnishing us with a short leaflet on how to pack tea and have much pleasure in publishing it.

We regret to say that there is left on our hands a large quantity of the Discussion on the Labour Question which we had printed separately and which we hoped that members of District Associations would take to send Home to absent Proprietors and others whom the Book of Proceedings does not reach.

Scientific Officer's Papers.

CXXIV.—COMPOSTS.

In continuation of the work being done on Composts, some of which has already been reported upon in Scientific Officer's Paper 120., the results of an experiment made at Hoskottay Estate are now available.

This compost was made upon the lines adopted by Mr. Pittock as reported in the *Planters Chronicle* Vol. VII. p. 465. Two brick pointed pits were made and in these alternate layers of Pulp, Ashes, and Bone Meal were placed and when full straw pandals were constructed over the pits and the compost allowed to rot down until November when it was applied.

24 tons 3 cwts of raw material were originally put into the pits and this when rotted down gave 15 tons of Compost ready for application, a loss of about 38% taking place during the fermentation and composting. A sample taken gave the following analysis.

		Air dry sample.	Ash.	Calculated to dry material.
Moisture ...	... ...	10·40	—	—
*Organic Matter	... ...	30·39	—	33·92
Ash 59·21	Insoluble Matter	25·05	42·38	28·00
	Phosphoric Acid	4·34	7·33	4·85
	Potash	0·76	1·28	0·85
	Lime	5·89	9·95	6·58
	Other soluble Mineral matter ...	23·13	39·06	25·80
		100·00	100·00	100·00
*Containing Nitrogen	... ...	1·96	—	2·19

The Compost when sampled was of a cheesy composition and wet, containing actually 68·8% of moisture and then weighed 20 tons. Consequently this 20 tons of compost contained 6·24 tons of dry matter and from the analysis the monetary value of this can be calculated in terms of Nitrogen, Phosphoric Acid, and Potash and set against the actual cost of preparation and thus a profit and loss account can be made. For this purpose 1 lb. of Nitrogen is taken as costing 8¼ annas bought as Ground Nut Poonac, 1 lb. of Phosphoric Acid as costing 2 annas 4 pies bought as Basic Slag, and 1 lb. of Potash as costing 2 annas 10 pies bought as Sulphate of Potash. These are the costs f.o.r, and cost of transport to the estate has been neglected, but it must be remembered that this is in some cases a considerable item and when taken into account makes the compost more valuable than appears below. As set against this nothing has been charged for cost of application.

On this basis we get the following :—

COST OF MAKING.

	Rs.	A.	P.
2 Pits brick pointed 10 x 6 x 3	12	0	0
21 cwts. Bone Meal	89	4	0
Transport	10	0	0
21 tons Pulp 42 cwts. Ashes and Line Sweepings } Carrying and putting in the Pits	21	0	0
Straw pandals over the pits	3	12	0
Total...	136	0	0

VALUE OF COMPOST.

	Rs.	A.	P.
6'24 tons of dry matter in compost contain:—			
306'1 lbs. of Nitrogen @ 8'5 as. per lb.	162	9	8
677'9 lbs. of Phosphoric Acid @ 2 annas 4 pies per lb. ...	98	13	9
118'8 lbs. of Potash @ 2 annas 10 pies per lb.	21	0	7
Total...	282	8	0

This leaves a profit of about Rs.146 or, since there were 15 tons of the compost as applied, a profit of nearly Rs.10 per ton over and above the value of the manure. In addition to this the pits are still in good condition and need only a little repairing before being used again so that the Compost made in them next year will be still cheaper.

RUDOLPH D. ANSTEAD,
Planting Expert.

COFFEE.

The quantity of coffee exported in 1912, which includes 34 tons from the New Hebrides, amounted to 404 tons, valued at £33,092. Since the year 1903 coffee exports have advanced steadily, the average yearly increase having been slightly over 71 tons. The quantity exported during the five years 1907-1911 averaged 454½ tons a year. In 1912, however, owing to the ravages of the coffee plant-disease, known by the name *Hemileia vastatrix*, there was a decrease in the exports as compared with 1911. This disease, which made its appearance here towards the end of 1910, has done much damage, and in spite of all efforts to stop it is still spreading slowly. Some plantations have been completely, others as yet only partially destroyed, the the timely spraying of the plants with *Bouillie Bordelaise* (a preparation containing sulphate of copper) having had the effect of checking, though not, as it had been hoped, of eradicating the disease. Many plantation owners are now discarding the *Arabica* for the *Robusta* variety, which offers greater resistance to the disease, whilst others, having lost all or most of their plants, are substituting cotton for coffee. The present area under coffee is estimated to be about 1,500 hectares (3,705 acres). The quality of New Caledonian coffee is very good.—*Diplomatic and Consular Reports, France.*

THE PHILOSOPHY OF MANURING.

The principles which guide the practical man in his choice of manures and fertilisers are simple and well known. In the first place the growing plant requires large quantities of water, if only to repair the inevitable and continuous loss of water vapour from the leaves. The plant itself contains an extraordinarily large percentage of water, and all the chemical operations which take place in it depend for their fulfilment on a larger or smaller quantity of water in the tissues of the plant. Hence if he is to obtain larger crops the gardener must see to it that an adequate supply of water is available to the plant. It is not enough for him—even where it is practicable—to add water: he must build up a soil of such constitution that it will both hold water and part with it readily to the plant. Since decaying organic matter, farmyard manure, for example, imparts this property to the soil, this class of substance is looked upon as an ideal manure.

In the second place, the practice of manuring depends on the well established fact that certain mineral substances, and particularly nitrogen compounds, potash and phosphoric acid, are essential plant foods. Hence the art of manuring consists in the amelioration of the water conditions of the soil and in supplying deficiencies in what may be called the feeding capacity of the soil. There is, however, a third principle, which is no less important, but which is apt to be overlooked. That principle is an economic one. The gardener must secure the conditions which we have indicated at the minimum of cost.

By the addition of dung in sufficiently large quantities an adequate amount of essential food may be provided; but since dung contains relatively small quantities of such an essential as phosphoric acid it is evident that a more economical method of manuring consists in adding, together with a small amount of dung, some phosphatic fertilizer, such, for example, as basic slag.

In recent years these old-established principles have been challenged, and we have been asked to revise the articles which constitute the philosophy of manuring.

The new philosophy, which has been urged by Messrs. Whitney and Cameron, of the Bureau of Soils, holds that all soils contain large stores of the essential foods, phosphates and potash, that the water in the soil—the soil solution—contains enough of these substances for the purpose of plant growth, and that one soil is not more fertile than another because it is richer in such mineral substances as potash or phosphates, but primarily because it is in better case to supply the crop with all the water which it requires. A second cause of the inferior fertility of certain soils is found by Messrs. Whitney and Cameron to lie in the existence therein of toxic substances produced by the roots of previous crops, and left in the soil to the detriment of the growth of the plants which succeed these crops.

In order to meet the objection that artificial potash and phosphatic manures are known to increase soil fertility these investigators urge that the fertilisers act, not by supplying food to the plant, but by putting the toxic soil-substances out of action.

From the point of view of immediate practice the newer hypothesis is not important; but from that of the ultimate practice of manuring no less than from the point of view of scientific horticulture it is of very great importance indeed. Hence the investigations carried out by Mr. A. D. Hall and his colleagues at Rothamsted, and published recently by the Royal Society, are particularly opportune, The net result of these investigations is to vindicate the older view, and to show that the revolutionary toxic hypothesis is without foundation. The conclusions reached by Mr. Hall, which are of greatest interest, are, first, that the Rothamsted plots, which are to-day producing poor crops owing to the fact that essential foods—now Potash, now phosphoric acid—have been withheld during the past sixty years, yield good crops when their *particular* deficiencies are made good. Thus a phosphorus-starved soil gives a normal good crop when phosphatic manures are added to it, and similarly a potash-starved soil recovers its fertility when its defect of potash is made good.

Second, although the soil of such plots has carried continuously for the past 60 years crops of one kind only—wheat in some cases, barley in others—water extracts from tho soil are found to have no toxic action whatever on the roots of similar or different plants.

Hence the toxic theory of soil fertility may be dismissed, or at most regarded as of very limited applicability.

Third, the Whitney-Cameron hypothesis that all soils contain enough potash and phosphates for plant-feeding purposes is shown to be improbable. For Hall demonstrates that, as we might expect on the old view, the feeding value of a soil extract increases within wide limits with its concentration. That is to say, a solution which contains *more* potash or phosphates produces bigger crops than one which contains less of the substances. Naturally, there is a limit to this law that concentration increases crop, and as we all know, an excess of a soluble fertiliser may result in no crop at all. The rôle, therefore, of the artificial fertiliser is to bring the " soil solution" up to the maximum beneficient concentration, and we may still hold the common-sense view that fertilisers used as supplements to dung exert their beneficial effects by reason of the plentiful supplies of specific foods which they put at the disposal of the plant.—*The Gardeners' Chronicle.*

TAPPING CEARA PLANTS.

The fall in price is causing so much apprehension among the producers of plantation rubber can be met in some measure by improvement in methods of production. That there is room for improvement there can be no doubt, and therefore records such as the following, though dealing with matters of detail only, are of a somewhat general interest:—

I have recently been tapping some Ceara Plants (Manihot Glaziovil) at my nursery in Dabadia, Trinidad. They were planted about ten years ago, at an elevation of 20 to 300 feet, and this is the first time they have been tapped. The outside bark was first peeled off, as it would be too tough to cut with a knife. A herring-bone tapping was then made on one side of the tree and a boy stationed by the side with a syringe, from which be supplied a constant slight flow of water down the centre cut. In this way quite a large quantity of latex was obtained, which was afterwards coagulated by means of an 8 per cent solution of lime juice or by sulphuric acid. The slabs thus formed were taken the next day out of the coagulating pans and placed to dry on shelves lined with perforated zinc. When dry they were removed to an air-tight chamber, and smoked for fifteen mintues over a charcoal fire on which were placed seeds of the Koperite Palm (Maximiliana Martiana). The temperature of the room was maintained at about 80° to 90° When the smoking was completed the rubber was placed in powdered sulphur, which helps to keep it in condition. *Cyril Warren, Dabadia, Trinidad.—The Gardeners' Chronicle.*

THE BRITISH ASSOCIATION AT BIRMINGHAM.

SECTION M.

Agriculture.

Opening Address by Prof. T. B. Wood, President of the Section.

(Continued.)

The suggestion that ordinary soils contained a factor which limited their fertility emanated in the first instance from the American Bureau of Soils. The factor was at first thought to be chemical, and its presence was tentatively attributed to root excretion. Certain organic substances, presumably having this origin, have been isolated from sterile soils, and found to retard plant growth in water-culture. It is claimed, too, that the retardation they cause is prevented by the presence of many ordinary manurial salts with which they are supposed to form some kind of combination.

Contributions to the subject have come from several quarters, but whilst the suggested presence of an inhibitory factor has been generally confirmed, its origin as a root-excretion and its prevention by manurial salts has not received general confirmation outside American official circles. The matter has been strikingly cleared up by the work of Russell and Hutchinson at Rothamsted, who observed that the fertility of certain soils which had become sterile was at once restored by partial sterilisation, either by heating to a temperature below 100°C., or by the use of volatile antisepties such as toluene. This observation suggested that the factor causing sterility in these cases was biological in nature that it consisted, in fact, of some kind of organism inimical to the useful fermentation bacteria, and more easily killed than they by heat or antiseptics. After a long series of admirable scientific investigations these workers and their colleagues have shown that soil cotained many species of protozoa, which act upon the soil bacteria, whose numbers they keep within definite limits. In certain circumstances, such, for instance, as those existing in the soil of sewage farms, and in the artificial soils used for the cultivation of cucumbers, tomatoes, &c., under glass, the protozoa increase so that the bacteria are reduced below the numbers requisite to decompose the organic matter in the soil into substances suitable for absorption by the roots of the crop. Practical trials of heating such soils, or subjecting them to the action of toluene, or other volatile antiseptics, have shown that their lost efficiency can thus be easily restored, and the method is now rapidly spreading among the market gardeners of the Lea Valley.

I have attempted to sketch the chief points of this subject with some detail in order to show that strictly scientific work, quite outside the scope of what some people still regard as "practical," may result in discoveries which, apart from their great academic interest, may at once be turned to account by the cultivator. The constant renewal of expensively prepared soil which becomes "sick" in the course of a year or so is a serious item in the cost of growing cucumbers and tomatoes. It can now be restored to fertility by partial sterilisation at a fraction of the cost of renewal, and considerable sums are thus saved by the Lea Valley growers.

For my second instance of scientific work which has given results of direct value to farmers, I must ask to be allowed to give a short outline of the wheat-breeding investigations of my colleague Prof. Biffen. Even as late as fifteen years ago plant-breeding was in the purely empirical haphazard stage. Then came the rediscovery of Mendel's laws of heredity, which put in the hands of breeders an entirely new weapon. About the same time the Millers' Association created the Home-grown wheat Committee, of which Biffen was a member. Through this committee he was able to define his problem as far as the improvement of English wheat was concerned. There appeared to be two desiderata: (1) The production of a wheat which would crop as well as the best standard home-grown varieties, at the same time yielding strong grain, *i. e.*, grain of good milling and baking quality; and (2) the production of varieties of wheat resistant to yellow rust, a disease which has been computed to decrease the wheat crop of the world by about one-third.

The problem having been defined, samples of wheat were collected from every part of the world and sown on small plots. From the first year's crop single ears were picked out and grown on again. Thus several hundred pure strains were obtained. Many were obviously worthless. A few possessed one or more valuable characteristics: strong grain, freedom from rust, sturdy straw, and so on. These were used as parents for crossing, and from the progeny two new varieties have been grown thoroughly tested, and finally put on the market. Both have succeeded, but both have their limitations. Burgoyne's Fife, which came from a cross between strains isolated respectively from Canadian Red Fife and Rough Chaff, was distributed by the Millers' Association after a series of about forty tests, in which it gave an average crop of forty bushels per acre of grain, which milled and baked practically as well as the best imported Canadian wheat. It is an early-ripening variety which may even be sown as a spring wheat. It has repeatedly been awarded prizes for the best sample of wheat at shows, but it only succeeds in certain districts. It is widely and successfully grown in Bedfordshire and Dorset, but has not done well in Norfolk. The other variety, Little Joss, succeeds much more generally. In a series of twenty-nine trials scattered between Norfolk and Shropshire, Kent and Scotland, it gave an average of forty-four bushels per acre, as compared with forty bushels given by adjoining plots of Square Head's Master. It originated from a cross between Square Head's Master and a strain isolated from a Russian graded wheat known as Ghirka. Its grain is the quality of ordinary English wheat. It tillers exceptionally well in spring, and is practically rust-proof. Its one drawback is its slow growth during the winter if sown at all late. It has met with its greatest success in the Fen districts, where rust is more than usually virulent.

The importance of this work is not to be measured only by the readiness with which the seed of the new varieties has been tried by farmers and the extent to which it has succeeded. The demonstration of the inheritance of immunity to the disease known as yellow rust, the first really accurate contribution to the inheritance of resistance to any kind of disease, inspires hope that a new method has appeared for the prevention of diseases in general.

Biffen's work too shows the enormous value of co-operation between the investigator and the buyer in defining problems connected with the improvement of agricultural produce. It is open to doubt if a committee of farmers would have been able to define the problems of English wheat production as was done by the Millers' Committee, and in the solution of any problem its exact definition is half the battle. Mackenzie and Marshall in their work on the "Pigmentation of Bacon Fat" and on the spraying of sows for fattening, have found the great value of consultation with the staffs of several large bacon factories. There seems to be in this a general lesson.

that before taking up any problem one should get into touch not only with the producers but with the buyers, from whom much useful information can be obtained.

I feel that Biffen's work has borne fruit in still another direction for which perhaps he is not alone responsible. Twenty years ago agricultural botany took a very subsidiary position in such agricultural examinations as then existed. In some of the agricultural teaching institutions there was no botanist, in others the botanist was only a junior assistant. It is largely due to the work of Biffen and the botanists at other agricultural centres that botany is now regarded as perhaps the most important science allied to agriculture.

I must here repeat that I am not attempting to make a complete survey of all the results obtained in the last twenty years. My object is only to pick out some of the typical successes and failures and to endeavour to draw from their consideration useful lessons for the future. So far I have not referred to the work which has been done in the nutrition of animals, and I now propose to conclude with a short discussion of that subject. The work on that subject which has been carried out in Great Britain during the last twenty years has been almost entirely confined to practical feeding trials of various foods or mixtures of foods, trials which have been for the most part inconclusive.

It has been shown recently that if a number of animals in store condition are put on a fattening diet, at the end of a feeding period of twelve to twenty weeks about half of them will show live-weight increases differing by about 14 per cent. from the average live-weight increase of the whole lot. In other words, the probable error of the live-weight increase of a single fattening ox or sheep is 14 per cent. of the live-weight increase. This being so, it is obvious that very large numbers of animals must be employed in any feeding experiment which is designed to compare the feeding value of two rations with reasonable accuracy. For instance, to measure a difference of 10 per cent. it is necessary to reduce the probable error to 3 per cent. in order that the 10 per cent. difference may have a certainty of thirty to one. To achieve this, twenty-five animals must be fed on each ration. Those conversant with the numerous reports of feeding trials which have been published in the last twenty years will agree that in very few cases have such numbers been used. We must admit then that many of the feeding trials which have been carried out can lay no claim to accuracy. Nevertheless, they have served a very useful purpose. From time to time new articles of food come on the market, and are viewed with suspicion by the farmers. These have been included in feeding trials and found to be safe or otherwise, a piece of most useful information. Thus, for instance, Bombay cotton cake, when first put on the market, was thought to be dangerous on account of its wooly appearance. It was tried, however, by several of the agricultural colleges and found to be quite harmless to cattle. Its composition is practically the same as that of Egyptian cotton cake, and it now makes on the market practically the same price.

Soya-bean cake is another instance of a new food which has been similarly tested, and found to be safe for cattle if used in rather small quantities and mixed with cotton cake. The price is now rapidly rising to that indicated by its analysis. Work of this kind is, and always will be, most useful. Trials with few animals, whilst they cannot measure accurately the feeding value of a new food, are quite good enough to demonstrate its general properties, and its price will then gradually settle itself as the food gets known.

Turning to the more strictly scientific aspects of animal nutrition, entirely new ideas have arisen during the last twenty years. Twenty years ago the generally accepted view of the *role* of proteins in nutrition was that the proteins ingested were transformed in the stomach and got into peptones, and absorbed as such without further change. Splitting into crystalline products, such as leucin and tyrosin, was thought only to take place when the supply of ingested protein exceeded the demand, and peptones remained in the gut for some time unabsorbed. It is now generally agreed that ingested protein is normally split into crystalline products which are separately absorbed from the gut, and built up again into the various proteins required by the animal. If the ingested protein does not yield a mixture of crystalline products in the right proportions to build up the proteins required, those crystalline products which are in excess are further changed and excreted. If the mixture contains none of one of the products required by the animal, then life cannot be maintained This has been actually demonstrated in the case of zein, of the proteins of maize, which contains no tryptophane. The addition of a trace of tryptophane to a diet, in which zein was the only protein, markedly increased the survival period of mice.

The adoption of this view emphasises the importance of a knowledge of the composition of the proteins, and especially of a quantitative knowledge of their splitting products, and much work is being directed to this subject in Germany, in America, and more recently in Cambridge, as a result of the creation there of an institute for research in animal nutrition by the Board of Agriculture and the Development Commission. This work is expected ultimately to provide a scientific basis for the compounding of rations, the idea being to combine foods the proteins of which are, so to speak, complementary to each other, one giving on digestion much of the products of which the other gives little. Meantime, it is desirable that information should be collected as to mixtures of foods which are particularly successful or the reverse.

Here the question arises, for what purpose does the animal require a peculiarly complicated substance like tryptophane? The natural suggestion seems to be that the tryptophane grouping is required for the building up of animal proteins. If has also been suggested that such substances are required for the formation of hormones, the active principles of the internal secretions the importance of which in the animal economy has received such ample demonstration in recent years. The importance of even mere traces of various substances in the animal economy is another quite recent conception. Thus it has been shown, both in Cambridge and in America, that young animals fail to grow on a diet of carefully purified casein, starch, fat, and ash, although they will remain alive for long periods, In animals on such a diet, however, normal growth is at once started by the addition of a few drops of milk or meat juice, or a trace of yeast, or other fresh animal or vegetable matter. The amount added is far too small to affect the actual nutritive value of the diet. Its effect can only be due to the presence of a trace of some substance which acts, so to speak, as the hormone of growth. The search for such a substance is now being actively prosecuted. Its discovery will be of the greatest scientific and practical interest.

Evidently new ideas are not lacking amongst those who are engaged in investigating the *role* of the proteins and their splitting products in the animal economy. But of more immediate practical interest is the question of the amount of protein required by animals under various conditions. It is obviously impossible to fix this amount with any great accuracy, since proteins differ so widely in composition, but from many experiments, in which a nitrogen balance between the ingesta and the excreta was made, it appears that oxen remain in nitrogenous equilibrium on a ration containing about one pound of protein per 1.000 lb. live-weight per day. All the British experiments of a more practical nature have been recalculated on a systematic basis by Ingle, and tabulated in the Journal of the Highland and Agricultural Society. From them it appears that increase of protein in the ration, beyond somewhere between one and a half and two pounds per 1,000 lb. live-weight per day of digestible protein ceases to have any direct influence on increase in live-weight.

We may fairly conclude, then, that about two pounds of proteins per 1,000 lb. live-weight per day is sufficient for a fattening ox. This amount is repeatedly exceeded in most of the districts where beef production is a staple industry, the idea being to produce farmyard manure rich in nitrogen. The economy of this method of augmenting the fertility of the land is very doubtful. The question is one of those for the solution of which a combination of accurate experiment and modern accountancy is required. Protein is the most expensive constituent of an animal's dietary. If the scientific investigator, from a study of the quantitative composition of the proteins of the common farm foods, and the economist, from careful dissection of farm accounts, can fix an authoritative standard for the amounts of protein required per 1,000 lbs. live-weight per day for various types of animals, a great step will have been made towards making mutton and beef production profitable apart from corn-growing.

For many years it has been recognised that an animal requires not only so much protein per day, but a certain quota of energy, and many attempts have been made to express this fact in intelligible terms. Most of them have taken as basis the expression of the value of all the constituents of the diet in terms of starch, the sum of all the values being called the starch equivalent. This term is used by various writers in so many different senses that confusion has often arisen, and this has militated against its general acceptance. Perhaps the most usual sense in which the term is used is that in which it means the sum of the digestible protein multiplied by a factor (usually 9·4) plus the digestible fat multiplied by a factor (usually 2·3), plus that digestible carbohydrates. This, however, gives misleading values which are too high in concentrated foods and too low in bulky foods, the discrepancy being to the larger proportion of the energy of the bulky foods which is used up in the much greater work of digestion which they require. Kellner and his school has devised a method which measures the starch equivalent by experiment, a much more satisfactory and practical method than any system which depends purely on calculation.

An animal or a number of animals are kept on a maintenance diet so that their weight remains constant. To this diet is added a known weight of starch, and the increase in weight observed. The animal or animals are then placed again on the same maintenance diet for some time, and then a known weight of the food to be tested is added, and the increase in weight again observed. The data thus obtained indicate that so many pounds of starch produce as much increase in live-weight as so many pounds of the food under experiment, from which it is easy to calculate how many pounds must increase in live-weight as 100 lb. of the food under experiment. The starch equivalent thus found expresses an experimentally determined fact which is of immediate practical value in arranging a dietary, its value, however, depending on the accuracy with which it has been determined. Kellner and his colleagues have thus determined the starch equivalents of all the commonly used foods. Their values for concentrated foods, and other foods commonly used in Germany have been determined with considerable accuracy, and with the method which has also been devised for defining the relation between the experimentally determined equivalent and the equivalent calculated from the analysis by means of a formula, they form by far the most trustworthy basis for arranging a feeding ration including such kinds of foods.

But roots, which form the staple of the diet of fattening animals in Great Britain, are not used on the same scale in Germany, and Kellner's starch equivalents for roots have not been determined with sufficient accuracy or under suitable conditions to warrant their use for arranging diets under our conditions.

This, and the fact that the term starch equivalent is so widely misunderstood, is no doubt the reason why the Kellner equivalent has not been more generally accepted in Great Britain. An advance will be made in the practice of feeding as soon as the starch equivalent of roots has been accurately determined under our conditions when the Kellner equivalents will no doubt come into general use.

I have now reached the end of my survey. I recognise that it is very incomplete, and that I have been compelled to neglect whole subjects in which important work has been done. I venture to hope, however, that my words have not been altogether unprofitable. It is somewhat difficult to summarise what is in itself really nothing but a summary. Perhaps, however, I may be allowed to point out once more what appears to me to be the moral of the last twenty years of work in agricultural science.

The many practical field and feeding tests carried out all over the country have demonstrated several very striking results; but, if they are to be continued with profit, more trouble must be taken to insure accuracy. Farmers are ready to listen. It behoves us more than ever to found what we tell them on accurate results.

Besides such practical trials, however, much has been done in the way of individual scientific work. The results thus obtained, as, for instance, Russell and Hutchinson's partial sterilisation of soils, Biffen's new wheats, and Beaven's pure Archer barley, are of practical value to the farmer as immediate as the most practical field trials, and of far wider application. —*Nature.*

CEYLON.

RUBBER EXPORTS.

The following statistics of the exports of rubber of domestic production from Ceylon during the month of July, and the seven months ended July, 1912 and 1913, have been extracted from official returns issued by the Ceylon Government:—

To		July 1912 Lbs.	July 1913 Lbs.	Jan.-July 1912 Lbs.	Jan.-July 1913 Lbs.
United Kingdom	...	750,930	1,274,318	3,943,655	6,468,257
United States	...	274,700	515,393	2,042,505	3,723,904
Other countries	...	159,228	326,140	975,649	2,350,546
Total exports of rubber of domestic production	...	1,184,858	2,115,851	6,951,802	12,542,707

The Board of Trade Journal.

CORRESPONDENCE.

The Labour Commission.

THE EDITOR,
The Planters' Chronicle,
Bangalore.

Sir,—The correspondence under this head in your issue of 6th inst. is most interesting, and as you say, the more opinions we have ventilated the more easily will the Committee be able to grasp the situation as generally viewed by planters.

I must confess myself quite unable to understand Mr. Newcome's objections. Why should the establishment of a Labour Commission (I like Mr. Hunt's "Bureau") make it easier for Rubber and Tea Concerns to draw away his or any Coffee planters labour? They are doing that to help him to *keep* his advanced labour, as the maistries and coolies advanced by him will be watched, refused a second advance by anyone who has joined the Bureau, and traced and hunted if they take the wrong road. As to "crimping," Government has laid down that the cooly is a free agent and can only be secured for one season; he is at perfect liberty to pay up and change his maistry or estate for the next season; and competition will see that he probably does, whether we have a Bureau or not. But I do not call that crimping—what I understand by crimping is the deliberate enticing away of an engaged man from his engagement by further advances or other means. I have had coolies enticed away to other districts, who owed my maistries large sums. I have written in vain to the crimper and the Manager of the estate they were enticed to—and I believe that with a Labour Bureau those coolies would either not have been carried off, or they would have been so hunted that they would have possibly wished that they had not listened to the voice of the charmer. As things are, I can do nothing. I believe that the registration of coolies and the general check on their taking advances from two or more maistries will be warmly welcomed by the honest suppliers, who after all are in the majority. I cannot for the life of me see what encouragement a Labour Commission can or will give to the enticement of labour from one place to another, just as I do not expect it to keep my coolies with me if the attractions elsewhere are greater. The Labour Commission is an attempt to bring into some order the chaos now prevailing; it is likely to be a check on the rogue, and a help to the honest man.

But we must be reasonable—the time is passed when gods and goddesses sprang to life fully grown and fully armed, and set the affairs of men straight at a word. We are planters, and we should understand that seed must be sown, jungle cleared, and much work put in before we gather crops. To paraphrase Mr. Mead, there is too much of 9*d* for 4*d*. wanted—too many people seem to want immediate and heavy dividends for their investment in the Commission; they have forgotten what the late Chairman said when closing the last meeting of the U. P. A,—"that it was gratifying to find delegates .....are ready to go back to their Associations and ask them *to make considerable sacrifices* for our future welfare." *Future* welfare is what our best minds are always impressing on us, the rank and file.

Mr. Mann's letter is most welcome, and to me most refreshing. I think we have all shrunk from pointing out what seemed so obvious, but apparently it was necessary, and he is to be congratulated on taking his courage in both hands and so clearly and reasonably teaching the A B C of the matter. As to those who do not lose in advances at present the amount that they are asked to contribute to the Labour Commission, let them read and *digest* what Mr. Richardson said at the Mundakayam Association

Meeting. We have to look to the *future*, those of us who are not suffering now. Also, let them take note of what Mr. Dandison said at the Nilgiri Meeting anent the once-secure local labour. Let them not forget that all things in this world change, and that unless we adapt ourselves to the changing conditions, we get left. We shall *all* probably be soon in Mr. Richardson's Class III, and if we possess an organization to secure to us more or less the labour we have found and advanced, we shall be in a better position (and one well worth Re. 1-4 an acre) than if we sit quaking with fear as to whether it has all gone off to other districts.

I do not expect wonders the first year, or even the second—but I do believe with Mr. Mann that the disciplining of the coolies will in time tend greatly to our advantage.

I have already expressed the opinion that the Assistant Commissioners will probably be of most use to us, and suggested that their salaries be increased at the expense of the Head Commissioner and Mr. Hunt now recommends 6 instead of 3 Assistants, to be paid for similarly. We shall probably need 6; but I have thought over the matter (and more especially since reading Mr. Martin's letter on direct recruiting) and now feel that if we could secure such experience as his the salary of the Head Commissioner would be well laid out—and I would rather pay a little more per acre to secure good assistants. This will probably not be a popular suggestion.

Notwithstanding the fluctuating character of an income to be derived from a cess on crops, as suggested by Mr. Mead, I am inclined to think that this plan would be more popular than a hard and fast acreage tax. Immature areas would be unburdened—poor estates would pay less than good ones —the wind would be tempered to the fleecing of the lamb—and the expenditure could be regulated to suit the *average* income of the Commission, much as we have to regulate our own, on incomes which fluctuate in the same way. It seems to me a very good suggestion.

The trouble is that until the prospectus is cut and dried, many will not join; and unless it is known who will join, it is next to impossible to have a cut and dried plan.

The matter is so important, that I would rather see it delayed and still further discussed than rushed through at the risk of half the community standing out. I reproduce a remark of Mr. Barnard in your issue of August 9th—"The truths in connection with the Labour Question are not yet *commonplaces* to Managers and Superintendents, and consequently they have not acquired the force of 'operative motives'." Many absentee proprietors are against the Commission, for they are not in touch with labour problems and it is not given to everyone to put things as he himself sees them, so perhaps these proprietors are not greatly helped in some instances by their representatives here. To such I would suggest a thorough perusal of your issue of December 6th, where Mr. Richardson, Mr. Mead, and Mr. Mann have said much that should be convincing.

Yours faithfully,
C. DANVERS.

THE EDITOR, 9th December, 1913.
The Planters' Chronicle,
Bangalore.

Sir,—Mr. Mead's suggestion that the funds required for the Labour Commission should be raised on the crops actually harvested seems to be carrying the principle of brotherly love a "leetle" too far. Producers to assist potential competitors to become actual ones is more than most Boards will swallow, I should imagine.

It is ninepence for fourpence for the immature ones and no mistake.

Yours faithfully,
"A POTENTIAL COMPETITOR."

THE EDITOR, 9th December, 1913.
The Planters' Chronicle,
Bangalore.

Dear Sir,—In the "Contents" page of your issue No. 49 you remark "In the letters published there is much food for thought." I agree but regret to observe that a great deal of it is very indigestible.

Yours faithfully,
"DYSPEPTIC."

December 11th, 1913, Rob Roy, Kotagiri, Nilgiris.

Tea Packing.

THE EDITOR,
The Planters' Chronicle.
Bangalore.

Dear Sir,—In continuation of the correspondence between "One Interested" in the *Planters' Chronicle* of 15th ultimo and Mr. Groves reply of November 29th I enclose a pamphlet recently received from London which may be of interest, and will clearly show the most correct method of packing a chest of Tea to avoid any loss in weight in London.

Yours faithfully,
ERNEST S. CLARKE.

In order to fully benefit by the system of weighing now in vogue by the London Customs Authorities, the following hints will prove of value.

The Customs now give the turn of the scale on the gross against the Importer, but on the Tare either for or against the Importer when it weighs under or over the half-pound.

The Tare (that is the weight of the empty package, complete with lid, lead, hoop iron and nails, etc.) should weigh four ounces over the pound, whether the package be chest or half chest.

The Gross weight of a package must in all cases weigh four ounces over the pound, whether the package be chest or half chest.

Subjoined is an example of the correct method of packing a chest to contain 100 lbs. of Tea.

Garden Weights.			Customs Weights, London.		
Tare.	Tea Net.	Gross Weight.	Gross Weight.	Tare.	Net.
27 lbs. 4 oz.	100 lbs.	127 lbs. 4 oz.	127 lbs.	27 lbs.	100 lbs.

From the above it will be seen that a margin of 4 oz. remains for any slight variations in weight of package during transit, and that no loss need result from the Customs Weighing under this system.

It is most important that the weights of the Weighing Machine, used on the Estate, should be constantly checked, and for this purpose a set of test weights should be kept. A beam scale is to be preferred to a platform one, as the former is the more accurate.

When a Superintendent, to equalize the tares of his package, adds pieces of lead or wood for that purpose, the material so added should be fixed inside the package, so as to prevent it falling out when the package is opened in London.

A Superintendent may "tare" and pack his teas with the greatest care, but if he afterwards permits his carpenter to plane away from the top of the package before nailing down, all his careful work may be wasted.

The Planters' Chronicle.

RECOGNISED AS THE OFFICIAL ORGAN OF THE U. P. A. S. I., INCORPORATED.

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THE U. P. A. S. I.

(INCORPORATED.)

Contents.

We wish all our readers a Merry Christmas and a Prosperous New Year and trust that Nineteen Fourteen will bring continued and increasing prosperity to all those engaged in those industries that go to form this Association.

The Scientific Officer contributes an interesting paper dealing with the mixing of Fertilisers and includes some valuable remarks from Mr. Birnie, the Agricultural Officer of the Potash Syndicate.

A short report of the Proceedings of the Wynaad Planters' Association is printed.

A very interesting article on the Prevention of Malaria is taken from the "United Empire." In these days when every individual labourer is an asset, it is necessary to study their health. This is an article that should be closely read, and we regret that all of it cannot be published in this issue but hope to conclude it in next week's.

The article on "Legislation and Plant Sanitation" which we reproduce from the "India Rubber Journal" should receive due attention. The necessity of some form of legislation throughout India has been recognised by this Association. What has been done in the Colonies and in America must be done here. The Pest Act which the Government of India is introducing is to prevent the importation of diseased plants and seeds. We hope, that this is only a first step and that later we may hope to have certain areas that are effected by any known damaging disease proclaimed and proscribed. But to secure this desired object, concerted and continued effort will be required.

Our Correspondence columns show only one letter but that is a very interesting one on "Green Bug" from Mr. Cayley, who gives us the benefit of his experience which is worth a ton of theory.

We would again like to call the attention of our readers and Members of the District Associations to the fact that we have a surplus stock of the discussion on the Labour Question printed separately for circulation in England.

SCIENTIFIC DEPARTMENT, U. P. A. S. I.

The Planting Expert returned to head-quarters on 15th December after attending a Meeting of the Board of Agriculture held at Coimbatore. The Chairman of the U. P. A. S. I. and the Planting Member were also present at the Meeting and the opportunity was taken to discuss in an informal manner with those experts of the Indian and Madras Governments most directly concerned the feasibility of introducing local legislation in the nature of a Pest Act, more especially to control the spread of Green Bug in Mysore and Coorg. Much of the matter before the Board was of only indirect interest to the planting community, but the discussion upon subjects like Agricultural Education, Dairying and Fruit culture, which occupied a considerable amount of the time are of general interest to all concerned with Agriculture in India. The Proceedings of the Board will be published in due course and an account of the Meeting has appeared in some detail in the Press so that further space need not be devoted to it here.

From 15th October to 2nd December the Planting Expert was occupied with a tour of the West Coast extending from Calicut in the North to Quilon in the South and including the districts of Malabar, Mundakayam, Peermade, and South Travancore. Twenty-four separate estates were visited and three planters meetings attended and much valuable and interesting information collected. It is not proposed to publish any definite report upon this tour in the *Chronicle*, but the more important problems will be discussed and commented upon during the next few issues in this section.

The Planting Expert does not expect to leave head-quarters again until the beginning of the New Year, and will devote his time until then to Correspondence and a certain amount of laboratory work.

Mixing of Fertilisers.—In connection with the demonstration of how to mix fertilisers on estates reported on page 532 of the present volume of the *Planters' Chronicle*, a correspondent wrote to point out that Slag and Nitrolim both contain free lime, while Steamed Bone as treated in India and according to the analysis contains the same amount of Nitrogen as ordinary ground Bone and that consequently the mixture made at Pollibetta was contrary to the rule that Lime should not be mixed with Nitrogenous fertilisers. It was pointed out in reply that Steamed Bone is usually employed for its Phosphoric Acid content and the amount of Nitrogen in it is so small that the actual loss on mixing it with Lime is also small. The chief loss occurs when Lime, or lime containing fertilisers are mixed with artificials like Sulphate of Ammonia or Nitrates. In the case of this demonstration an ideal mixture was not aimed at but rather a balanced fertiliser containing the most common materials used, the demonstration being of *how* to mix rather than of *what* to mix. It is difficult to get a perfect mixture and though no doubt it would be better not to mix Steamed Bone with Lime still it is a mixture often made and the loss is so small as to be negligible. The matter was referred to Mr. R. Birnie, the Agricultural Officer of the Potash Syndicate, who was kind enough to give the mixing demonstration referred to and Mr. Birnie has written the following letter which will prove of great interest and value to all planters concerned with mixing manures:—

"The Steamed Bone Meal on the Indian market is of two different" "kinds, *viz*:—(*a*) Steamed Bone Meal properly so called, a dusty, whitish" "material in the manufacture of which the bones have actually been" "steamed, and (*b*) a greyish brown material of a more or less granular" "nature derived from bones which have been long exposed to the sun and" "which as a consequence are dry and somewhat brittle. These bones are" "often not steamed at all, but merely pulverised and sold as 'Steamed'" "Bone Meal, because the Phosphoric Acid contained in them is much" "more readily available than that contained in the Bone Meal derived" "from the disintegration of fresh raw bones. The second variety contains" "more Nitrogen than the former, some 3½% I think speaking from memory."

"Though, according to theory, one should not mix a free-lime-bearing" "fertiliser with Steamed Bone lest the Nitrogen of the latter be lost, yet," "owing to the slowness of the resulting chemical action, and its limited" "extent, in actual practice the mixture is found to be quite a good one if" "made dry and the manure *incorporated with the soil soon after being*" "*made*. Indeed, if kept dry, the first mentioned variety will keep in" "the mixture without loss for some time. The latter variety, however," "should probably be similarly incorporated with the soil sooner after" "mixing. When well mixed with the soil any resulting chemical" "action of this mixture is so very gentle that the products of manurial" "value are retained by the soil instead of being partly diffused into the" "atmosphere. Hence the reason of this mixture being quite frequently" "used; a contravention of the broad rule of not using a free-lime-bearing" "manure along with Nitrogenous ones, a rule, however, which in its actual" "application contains several permissible exceptions."

Superphosphates in mixtures.—A similar enquiry has been made recently by a correspondent as to the advisability of mixing Lime with Superphosphates. The chief advantage possessed by Superphosphate over other forms of phosphatic fertilisers lies in the fact that the Phosphoric Acid it contains is in a soluble form and thus is more evenly distributed through the Soil, and brought more easily within the range of the roots of the crop. The Phosphoric Acid in Bones and rock phosphates from which superphosphate is made exists in an insoluble form as tricalcic phosphate, and if the Superphosphate is mixed with other manures containing calcium carbonate, or oxide, tricalcic phosphate may be reformed. Oxide of Iron and Alumina produce the same effect. The changed, or 'retrograded' phosphate resulting from such admixtures is insoluble in water, but soluble in Citric Acid, and hence the term 'Citrate soluble phosphate' often applied. Considerable difference of opinion exists as to the agricultural value of these citrate soluble phosphates; some agricultural chemists regard them as being of equal value to the soluble phosphates, while others consider them as only equal in value to the insoluble tricalcic phosphates. As the diffusive power of the phosphoric acid present has been destroyed the latter valuation appears to be the more reasonable. In mixing Superphosphate with other manures there is a danger that this retrogression may take place and the soluble nature of the phosphoric acid, for which an increased price is naturally paid, destroyed. Experiments have shown that in the case of a mixture of Superphosphate and Bone Meal retrogression is small and proceeds only slowly, and Bone Meal is the best form in which to use tricalcic phosphate for mixing with Superphosphate. In a mixture of Superphosphate and Basic Slag, on the other hand, the lime and the oxides of Iron in the latter produce rapid retrogression and this mixture should never be made, while a mixture of Superphosphate and Slaked Lime is still worse. A mixture of Superphosphate and Kainit may safely be made, retrogression in this case being due to the presence of Magnesium Salts, but the amount is small and the action slow.

R. D. A.

DISTRICT PLANTERS' ASSOCIATION.

Wynaad Planters' Association.

Proceedings of a General Meeting held at the Meppadi Club, on December 3rd, 1913.

PRESENT.—Messrs. Gillatt, Macleod, Powell, West and C. E. Abbott (Honorary Secretary). *Visitors:*—Messrs. Blackham and Simpson.

MR. WEST in the chair.

1872. *Proceedings of last Meeting* were confirmed

1873. *Attesting Contracts in Mysore.*—Read letter from Honorary Secretary to the Resident in Mysore forwarded through Secretary U.P.A.S.I. No reply has been received.

1874. *School of Tropical Medicine.*—Read U. P. A. S. I. circular 23/13 saying that as the Government intend to establish a Pathological Institute at Madras in which extensive facilities will be afforded for teaching Tropical Medicine and for the conduct of Research work connected with Tropical Diseases, it will not contribute to the London School, nor address the Government of India on the the subject.

1875. *Proposed Labour Rules.*—Resolved, that this Meeting thanks the Committee for the trouble it has taken in drawing out the rules which have been circulated to Members of the Association; but is of opinion that it is undesirable under present circumstances to agree to them. As this resolution will come up for confirmation at the next Meeting, it can, if so wished, be further discussed then.

1876. *Postal Delays.*—Read letter from Mr. G. R. C. Parker. The Honorary Secretary was requested to write to him.

1877. *Non-Execution of Warrants.*—Read details of Mr. West's cases. These were ordered to be printed in full, and will be sent to Members separately.

1878. *Planting Cinchona to supply Government with bark.*—Read circular from U. P. A. S. I.; also several replies received by Honorary Secretary. This Meeting is strongly of opinion that nobody would plant Cinchona in Wynaad to supply Government with bark at the suggested price 7/8*d* per unit of quinine.

1879. *Weights and Measures.*—No Member of this Association has informed the Honorary Secretary that he desires to give evidence before the Commission. But it is hoped that the U. P. A. S. I. will appoint witnesses to represent it.

A vote of thanks to the chair terminated the Proceedings.

(Signed) ALISTER WEST,
Chairman.

(„) C. E. ABBOTT,
Honorary Secretary.

THE PREVENTION OF MALARIA: ITS RELATIONSHIP TO AGRICULTURE.

By MALCOLM WATSON, M.D., D. P. H. Klang, F.M.S.

When our Chairman's great discovery, that the mosquito carried malaria, was announced, its far-reaching importance was instantly recognised by all countries with tropical possessions, and also by those in temperate climates where malaria existed. Our own Government in conjunction with the Royal Society at once sent a Commission to India and Africa. The German Government sent the great Koch to the East Indies, and tropical research entered a new path hitherto almost completely neglected.

It is not my purpose to-night to show how this line of research has resulted in a series of discoveries relating to yellow fever, relapsing fever, sleeping sickness, Malta fever, plague, &c., without parallel in the history of medicine; I wish rather to confine myself to malaria. Almost at once, two lines of attack on the disease developed. The Germans, French, and Italians proposed to eradicate the disease by the use of quinine. Of this I can only say, from extensive experience of the method, that in my opinion it cannot succeed.

The other line of attack was that developed by our Chairman—an attack on the mosquito—and in 1902, he completely eradicated the disease from Ismalia by means of drainage. Almost at the same time, similar measures at Klang resulted in a degree of success which I must confess was as gratifying as it was beyond our expectations. These areas were, however, small, and the cost was considerable. Further, they did not touch the great rural areas—the real home of malaria. How was the great outbreak which had swept from end to end of the Selangor Coast to be controlled?

Well, in studying this malaria, I found in a certain area there had been a steady rise from 1895 to 1899, and a fall from 1899 to 1902. The percentage of malaria treated at the hospital of the area had risen from 23 per cent. to 59 per cent., and then again fallen to 23 per cent. No one could account for either the rise or fall, but a study of official reports showed that the construction of a road parallel to the sea had interfered with drainage, and that the inauguration of a drainage scheme had been followed by improvement. This seemed a reasonable explanation, and I published an account of the observation.

At this time there was considerable malaria at the Klang end of the road on the estates, and the planters complained that they could not drain their estates on account of the road. As a result of their representations, the Government voted $110,000 for the Kapar drainage scheme, which provided for the drainage of 24,000 acres. From my point of view, this was an experiment on a large scale, and I did my best to profit by it. The first thing to be done was to get exact figures as to the amount of malaria present, and I accordingly made a series of blood examinations of children on the estates. A survey of the mosquitoes of the district was also made. To cut a long story short, it was found that malaria on the low alluvial coastal land was carried by a mosquito called *Anopheles umbrosus*, which breed in pools in the jungle; and that where the jungle was felled and the pools drained by open drainage, malaria completely disappeared, as shown by the health of the coolies improving, the admission to hospitals falling, the parasites disappearing from the blood of the children, and the percentage of children with enlarged spleens falling from 100 to 0. It was also shown that the percentage of children with enlarged spleens (called spleen-rate) was in direct proportions to the proximity of their houses to the breeding-place of the mosquito—that is the jungle pool.

So we evolved the simple rule—that to avoid malaria on the low coastland, we had only to house our coolies half a mile from the jungle. In some cases, we moved coolies away from jungle; in other cases, we removed the jungle from the coolies' houses. The results were absolutely certain. In fact, health could be guaranteed, as has been demonstrated on many estates. To show how invariably this rule worked out, I must give you two instances which at first were puzzling. An old established estate became unhealthy: within eighteen months its labour force had fallen from 600 to about 300; the daily sick in hospital rose from two or three to seventy to a hundred—with a similar number of milder cases of fever on the estate. The spleen-rate rose from three to fifty-eight. The death rate rose from ten to eighty. The labour force was so reduced that the rubber trees could not be tapped, and the manager was 30,000 lb. short of the estimate. I was quite at a loss to account for the outbreak. The manager assured me none of the coolie lines (or barracks) were within half a mile of the jungle, and I could find no breeding-place near to the lines within the estate. Ultimately, I decided to walk over the whole estate, and round its boundaries. It was only then I found that the estate boundaries did not run, as I supposed, but bent so as to come close to two new lines which had been built eighteen months before.

There had been a redistribution of coolies, so that all the coolies were mixed up, and then, at first, I was unable to locate the trouble. Needless to say, the new lines were abandoned, and within a short time improvement began, and there is every prospect of a return to health.

The spleen-rate dropped within eight months from 58 to 17 per cent. That outbreak cost the estate £10,000 sterling. In the other case, a divivion of an estate became healthy; the spleen rate dropped from 50 to 5. Yet jungle remained some sixteen chains away as before. I was nonplussed at first, but said to the manager: "Something has happened to the jungle; mosquitoes are not breeding in it." Then he remembered that that very jungle had been drained by the neighbouring estate in connection with its water supply, but the trees had been left standing.

Finally, thousands of acres have been opened on some estates with hardly a case of malaria, as the labour has always been kept at least half a mile from the jungle face being opened. Now the importance of all this is that what was always regarded as the great stronghold of malaria, collapsed almost without a struggle. The low-lying clayland, with a high subsoil water, was supposed to be the home of malaria, yet, as I have shown, we have the situation absolutely in our hands.

Again, the victory was as complete as our wildest hopes had dreamed, But just as our victory had been complete in the low flat land, we were at first as completely repulsed where we least expected it—namely, in the hill-land. We had always been taught that it was desirable to live on a hill if we wished to avoid malaria. Yet in the Federated Malay States, this is just the thing not to do in 999 cases out of a 1,000. And the reason is that malaria in the hill-land is carried by a mosquito which breeds in hill-streams, and cannot be abolished by open drainage. Its name is *Anopheles maculatus*

When convinced this was so, we decided to put these streams underground for a certain distance round the habitations on the estates. The exact distance is probably about half a mile—as we found it necessary to house coolies that distance from jungle breeding-places on flat land. But in the interests of economy, I consider each estate should begin with a smaller area and work outwards. Estates were at once forthcoming with the money; Seafield, Glenmarie, and North Hummock were the pioneers.

The result was a complete success on North Hummock, where the area to be done was small; while on the other two, there has been a distinct improvement in health, but not as complete as we wish or intend to get.

Then the Government drained an extensive area in the Federal Capital, the result of which was excellent. In the words of the Principal Medical Officer's (Dr. Sansom) Annual Report:—" The results were immediate and completely satisfied the most sanguine anticipation...... It may safely be claimed that general infection is now non-existent within the drained area." This drained area was that occupied by the highest Government officials in the land and reserved for them. No fault could be found with their houses, food of the inhabitants or general sanitary arrangements. Yet malaria had been an absolute scourge, sparing not even the highest. I have said enough to show that we are now on sound lines in dealing with malaria on hill land. Many details remain to be worked out. but we have already had enough success to encourage us to press on with the work.

So far, I have dealt only with dry cultivation; now I want to turn your attention for a moment to the cultivation of rice. So long as people live in the East, rice will be required, and we cannot consider we have the victory until we can drive malaria from the rice field.

When I came to the conclusion that *A. Maculatus* intended to stay in our hill streams and valleys, it occurred to me that we might drive it out by making the water unsuitable for its peculiar tastes. Ross had already suggested substituting one anophele for another in Mauritius by starving out the harmful one. Some mosquitoes like clean water, like *A. Maculatus.* Others like it muddy, and there is a series between the two. Well, I heard that rice fields were healthy, and it occurred to me that the cultivation drove out *A. Maculatus.* It was of comparatively little consequence if non-malaria carrying mosquitoes existed in the rice fields. I had no prejudice against any method which promised any help against malaria. I was even prepared to make the country a swamp if so we could get rid of the disease. So I investigated rice fields, and found 66,000 acres in Krian which were healthy. Only 2·7 per cent. of 718 children had enlarged spleen. But on coming to a valley in the hills I found a high degree of infection. *A. Maculatus* had been driven out, but other carriers had taken its place, so at the time I dropped this line of research.

It is, however, now being pursued by Dr. Strickland, the Travelling Entomologist in the F. M. S., and I am confident we will win in the end. We have always subsoil irrigation to fall back on.

Now I have shown that at least as regards dry cultivation we have established a working rule, if not a natural law, namely, that pool-breeding mosquitoes could be abolished by open drainage; that stream breeders could not be so abolished but required sub-drainage; that countries with no hill stream breeders would have no hill malaria. Was this true of the world? For, if so, it would give men a clearer idea of how the problem was to be dealt with, and offer very high hopes of ultimate success. Turning to India first, I found a strong similarity to Malaya, namely, the plains of Bengal healthy, and the Duars at the foot of the Himalayas very malarious. Now that we have got right names to our mosquitoes we know that *A. Maculatus*, occurs in the Duars and in the Jeypore hills in Madras. It may not be the sole carrier, as *A. Christophersi*, also a stream breeder, is a proved carrier. But the reports state that *A. Maculatus* is the commonest anophele in the upper portion of the Duars and lower hills. And in Ceylon it is also to be found.

Mr. Edwards of the British Museum kindly re-examined the Ceylon collection of insects and found it was present although misnamed. Severe malaria exists in the lower hills of Ceylon. Indeed for the whole country the spleen rate is 34 on over 92,000 children examined. Again *A. Maculatus* exists in Hong-Kong ; so we see wherever it exists malaria is severe.

Just across from the Malay Peninsula is Sumatra. In it the planters have established an excellent hospital system, and the death rate of the labour force does not usually exceed 10 per 1,000. I was naturally anxious to see this system, and Messrs. Harrisons and Crosfield kindly arranged for me to see an extensive area in North-east Sumatra. It is impossible to go into details, but I failed to find any evidence of malaria in the hills; and no trace of *A. Maculatus* in hill streams. Practically the only malaria was along the fringe of mangrove on the coast. The country is volcanic, and has excellent drainage. Whether *A. Maculatus* is absent for geographical reasons, or for chemical reasons, I cannot definitely say, but the latter cannot be excluded. Sumatra must therefore be ranked as one of the healthiest countries of the tropical world—no small advantage.

At Washington I could not find any specimen of *A. Maculatus* in Dr. Clara Ludlow's collection, which she kindly allowed me to examine, nor have I seen any report on the Phillippines which throws light on the distribution of malaria there.—*United Empire.*

(*To be Continued.*)

The Potash Industry.—This industry was on the whole satisfactory throughout 1912. The Potash Syndicate proved most useful in finding and opening up new markets for the ever-increasing output of potash ; of late important markets were opened up in Russia, Canada and the Argentine. The following table shows the increase in the potash sales since 1909 :—

	Marks.
1909 ...	... 116,500,000
1910 ...	... 146,500,000
1911 ...	... 160,000,000
1912 ...	... 177,000,000

The majority of the potash companies have been able to pay enhanced dividends for the year 1911. This is all the more surprising considering that the number of the companies has increased from 67 in 1911 to 1o7 in 1912,—***Diplomatic and Consular Reports, Germany,***

Coffee :—Honduras possesses magnificent lands for the growing of coffee, and these can be bought at reasonable prices. At present, however, little is being done in this line of agriculture, as the lands suitable to its growth are, generally speaking, situated in the interior where transport difficulties render production unremunerative. There are, however, a few people planting on more or less large scales, anticipating the construction of railways.—***Diplomatic and Consular Reports—Honduras.***

LEGISLATION AND PLANT SANITATION.

In a recent issue we remarked upon the attempts which have, in times somewhat remote, been made to establish legislation in order to prevent the introduction of obnoxious weeds, pests, and diseases from foreign countries, and to prevent the spread of diseases, pests, and weeds from one estate to another in particular territories. We again approach this subject from the standpoint of plantation rubber growers. Legislation has long been in force to prevent the introduction of the pests and diseases we have mentioned, from one country to another. In certain countries the importation of certain plants is entirely prohibited; in others, plants are only admitted with a definite certificate as to freedom from disease. In other cases, consignments of plants are, on their arrival in the colonies, subjected to fumigation or other treatment, in order to destroy pests and diseases.

To bring the matter nearer home, we might remind our readers that the importation of potatoes attacked by wart disease is prohibited in Ireland, gooseberry and currant bushes and potatoes in Jersey, and vines in Austria-Hungary, Belgium, Bulgaria, Germany, Holland, Italy, Russia, Switzerland. Turkey, Algeria, Mauritius, Tunis and Chile. In Malta, a preference is shown, for we find the importation of vines is prohibited, except they come from the United Kingdom, and potatoes except they come from Ireland. In Ceylon, Uganda, Grenada, and Dominica, etc., all plants may be admitted, but fumigation certificate from the authority at the port of shipment is necessary. On the other hand, we find that some countries have simply taken powers to prevent the introduction of insect fungus and other pests; whilst some countries—Newfoudland in particular—admit all plants, though even there the Governor-in-Council is empowered by the Potatoe Canker Act of 1910 to make regulations to control the importation of potatoes. Incidentally, we may mention that Canada prohibits the importation of potatoes from Newfoundland.

IMPORTATION TO CEYLON AND STRAITS SETTLEMENTS.

As we have previously remarked, all plants may be admitted into Ceylon, subject to being fumigated on landing. The particulars specify that living plants, tubers, roots, and certain fruit trees shall be treated with hydrocyanic acid gas, or such other treatment as may by deemed necessary by the Government zymologist. But wardian cases and other securely closed packages of plants, addressed to the Botanic Gardens, may be forwarded direct to that centre, and fumigated on their arrival.

So far, however, these regulations only prevent the introduction of insect pest, they do not prevent the introduction of fungi or obnoxious weeds. It may be that there has been some more recent legislation with regard to Ceylon, which has had under consideration the fungi and weeds referred to. In the Straits Settlements the Governor is empowered to make laws prohibiting or regulating the landing in the colonies of trees, plants, etc., all of which refer to tropical products.

LEGISLATION FOR ESTATES ONLY.

It seems so reasonable to enforce legislation with regard to the introduction of plants in the various colonies, that the point hardly commands further discussion. It does, however, lead us to a consideration of possible legislation for estates themselves. We are all aware that diseases, pests, and weeds are to be found in every colony, but certain estates are practically free from weeds, others have the pests and diseases well in hand, whilst many, especially those owned by natives, are sometimes allowed to become a perfect seed bed for weeds and various injurious insects and fungi.

Many planters are at the present time taking every possible step to prevent the spread of root, stem, and fruit disease of Hevea brasilensis. Some companies have gone to a very large expenditure in fighting Fomes on the roots, and bark canker on the stem. The life histories of most of the harmful fungi and insects are moderately well known, and specific instructions are available for every planter who wishes to keep the undesirable organisms down to the minimum. These introductions have in part or wholly been adopted on the estates, and improved upon from time to time so that there is no real excuse, so far as known diseases and pests are concerned, for any planter who claims to be up-to-date. Unfortunately there are many planters to be found who have either not got the means in the form or cash or labour to fight these pests, or they are unwilling to do so. It does not on the face of it, seem right that the labour and money used by-to-date planters should be wasted through lack of attention of his neighbour; hence the question arises as to whether legislation of some kind or another could be framed which would compel every planter to attend to diseases and pests.

COMPENSATION AND RIGHT OF INSPECTION.

The subject is by no means a small one. It opens up first the question of right of entry for any duly appointed inspector. It also raises the serious question of compensation when an inspector does the work for an estate under compulsion, or when he actually destroys a number of plants which are assessed at some particular value by the owner. The subject was once well discussed in connection with cocoa canker in Ceylon, but very little headway seems to have been made with the diseases of that particular plant. Nevertheless, we cannot see that there is any injustice in legislation of the kind we suggest. Certainly no one would deny that one village, may suffer from the neglect of an adjacent village, and no one would be permitted to endager the health of other animals without some check. If it is reasonnable to enforce legislation with respect to animals either human or otherwise, it is surely equally logical to suggest somewhat similar measures to deal with plants.

We are endeavouring to get details of legislation which has been outlined to deal with pests and diseases in other countries. We feel that while we know how to treat known diseases there may quite conceivably come a time when diseases of a far more dangerous character may arise. If there is then no combination among planters the result may be disastrous. In any case we can see no harm resulting from ventilating this subject at the present juncture.

WHAT IS DONE IN CANADA.

We need not go very far to learn something of the methods adopted by other countries. The Department of Customs, Canada, issued in July of last year particulars of the regulations which are in force. In Canada plants must be fumigated on their arrival, except the Minister of Agriculture allows them to pass through exempt. If on inspection nursery stock is found to be infested with specified insects. pests, or diseases, it is destroyed to the extent deemed necessary by the inspector and in his presence. Furthermore, any inspector entering any land or property where he has reason to believe certain pests or diseases are present, has the power to give instructions for the treatment or destruction of any affected plant. These instructions have to be carried out by the owner of the affected vegetation, and continued until the inspector is satisfied that the pests and diseases have been exterminated. Compensation not exceeding two-thirds of the value as assessed by the inspector of the plants destroyed under his instructions may be granted by the Government. Furthermore, in Canada it is illegal to sell or offer for sale any plants affected with specified insects, pest or diseases.' We know of no such legislation in the Middle East.

It is probable that any legislation which might hereafter be put forward for application in the tropics would deal only with specific pests and diseases of a character more dangerous than those now existing. We think it is well worth considering whether the legislative councils in the various colonies in the Middle East have the Power to put into force legislation for use on estates only. We shall return to this subject in a later issue. *The India-Rubber Journal.*

Mr. T. Southwell, Deputy Director of Bengal Fisheries, being impressed with the commercial possibilities of the local fishing industry, has decided to give a lecture on the subject, and the Chamber ot Commerce has issued a circular with the idea of getting together an audience of the kind to whom such an address in likely to make a direct appeal. The sort of people Mr. Southwell wishes to talk to are those who " could be induced, as a result of the lecture, to consider the feasibility of investing money in the project." There is not a great deal of capital available for investment at the moment, but the fishing industry, as a potential source of dividends, is undoubtedly worth considering.

As a matter of fact, an attempt to exploit the Bengal fisheries was made fifteen or twenty years ago, a local firm being the managing agents of the enterprise, while the name of the concern was the Bengal Fisheries Co., Ld. One of the chief promoters was Capt. J. H. Row. There was much disappointment because this business failed. Capt. Row wrote to us in 1897: " The experimental working of the Bengal fisheries was a success; it was at my own expense I printed and circulated the result of the work done to the 74 gentlemen who subscribed; and also pointed out at the time that £100,000 per annum could be derived (from the fisheries) in the Bay of Bengal alone, and I am in a position now to show that from 20 per cent, to 40 per cent. of this will be clean profit to any company with sufficient capital to work it." Alas and alack, this company did not succeed. The fish were good but difficulties attended their successful marketing. It does not follow that the failure need be repeated, but the incident illustrates the need for caution.

Sir Frederick Nicholson, in a pamphlet published in 1907, drew attention to the remarkable success of the fishing industry in Japan owing to the energy and intelligence of both Government and people, their close co-operation. the recognition of the importance of education, primary and industrial, and a number of other factors. In India the circumstances are not the same. " In India we have an industry equally primitive with that of the Japanese before 1857, a fishing population less numerous, less hardy, less adventurous, less adaptive, and more readily content with that which is; infinitely suspicious of Government interference yet almost incapable of initiative or of serious new departures without such intervention." No doubt, when he lectures, Mr. Southwell will tell us to what extent, if any, these unfavourable conditions have been modified.—*Capital.*

CORRESPONDENCE.

Yercaud, 21-12-13.

25

Green Bug.

THE EDITOR,
The Planters' Chronicle,
Bangalore.

Dear Sir,—Mr. Danvers wrote some time ago to try and find out why the Shevaroys have suffered comparatively slight damage from green bug. But, is that the case ?

Mr Fletcher saw a small part of one district at a uniform elevation of over 4,000 feet and estates of an age of 25 years and over and deduced from them that little damage was done.

The owners of these estates are no doubt in a position to say that though they have lost a good percentage of crop each year from bug, no permanent damage has been done except to bored trees and young clearings.

Below 4,000 feet considerable damage has been done by bug, patches and in some cases acreages being practically wiped out. Except in the case of young coffee, the chief cause on these hills of permanent damage by bug is and has been borer. A good healthy tree shakes off bug and except for a temporary loss of crop is none the worse, but a bored tree fares badly

Bored trees, unless badly injured, are commonly left on the Shevaroys and they recover and give good crops in a way they do not seem to do in Mysore, but they are only outwardly strong, and an attack of bug shows up their constitutional weakness.

If an examination was made of all the estates in the Shevaroys, it could be shown that, though brushing and spraying are very desirable and necessary, they are largely a waste of time and money unless borer is taken in hand too. I have seen an estate on these hills so bad with bug that it looked moribund, but a year after it had completely recovered, due in my opinion to its not being bored.

It may very likely be disputed that green bug and borer are a a fatal combination and they may not be everywhere, but they most certainly are in many cases. To give instance, let me mention 3 of the blocks on an estate here.

No. I, 30 acres, planted in 1898, and bored throughout before the shade grew up. The borer had apparently done no permanent damage but the whole block died out in one season from green bug in spite of, brushing.

No. II, 60 acres planted in 1903 and 1904. This had shade planted with the coffee and borer removed annualy and has hardly suffered from bug at all.

No. III, 25 acres planted in 1907. This, when 3 years old, was killed out by bug in a few weeks, but was not bored. In this case mealy bug. which was very virulent here one year and has hardly been seen before or since, was mainly responsible. Number three is only mentioned as showing how young coffee may suffer from bug in spite of precautions, but it is a fairly plausible deduction that, if No. I had not been bored, it would have weathered the storm as block II has.

Yours faithfully,
B. CAYLEY.

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